Southern Power & Industry

he Industrial and Power Journal of the Sou uthwest

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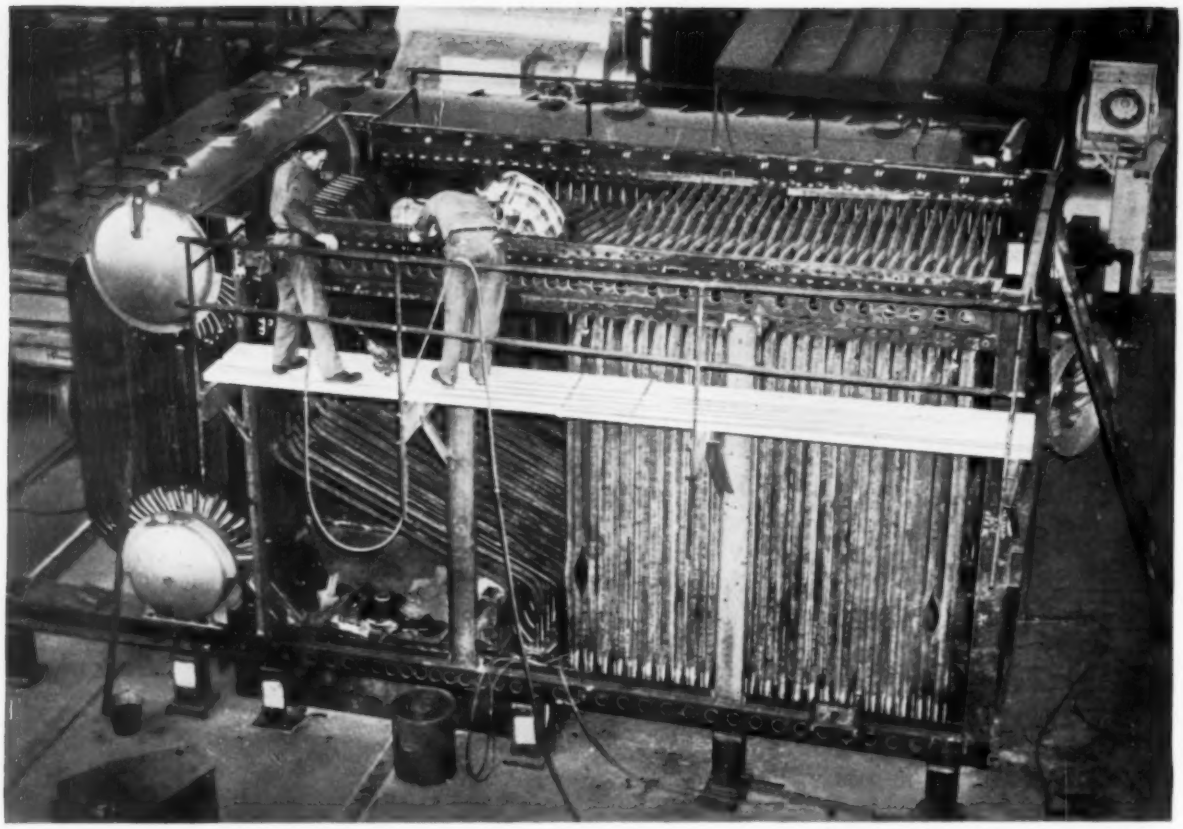
1961

AIR & GAS CLEANING

Reference Guide and
Buyer's Directory for
The South-Southwest

See Page 33

SPI



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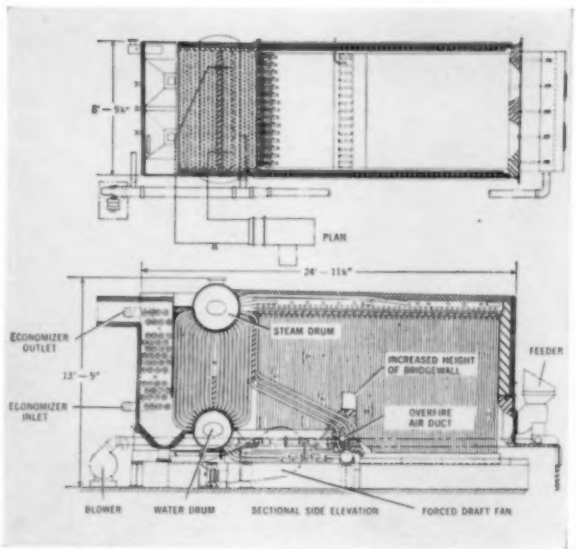

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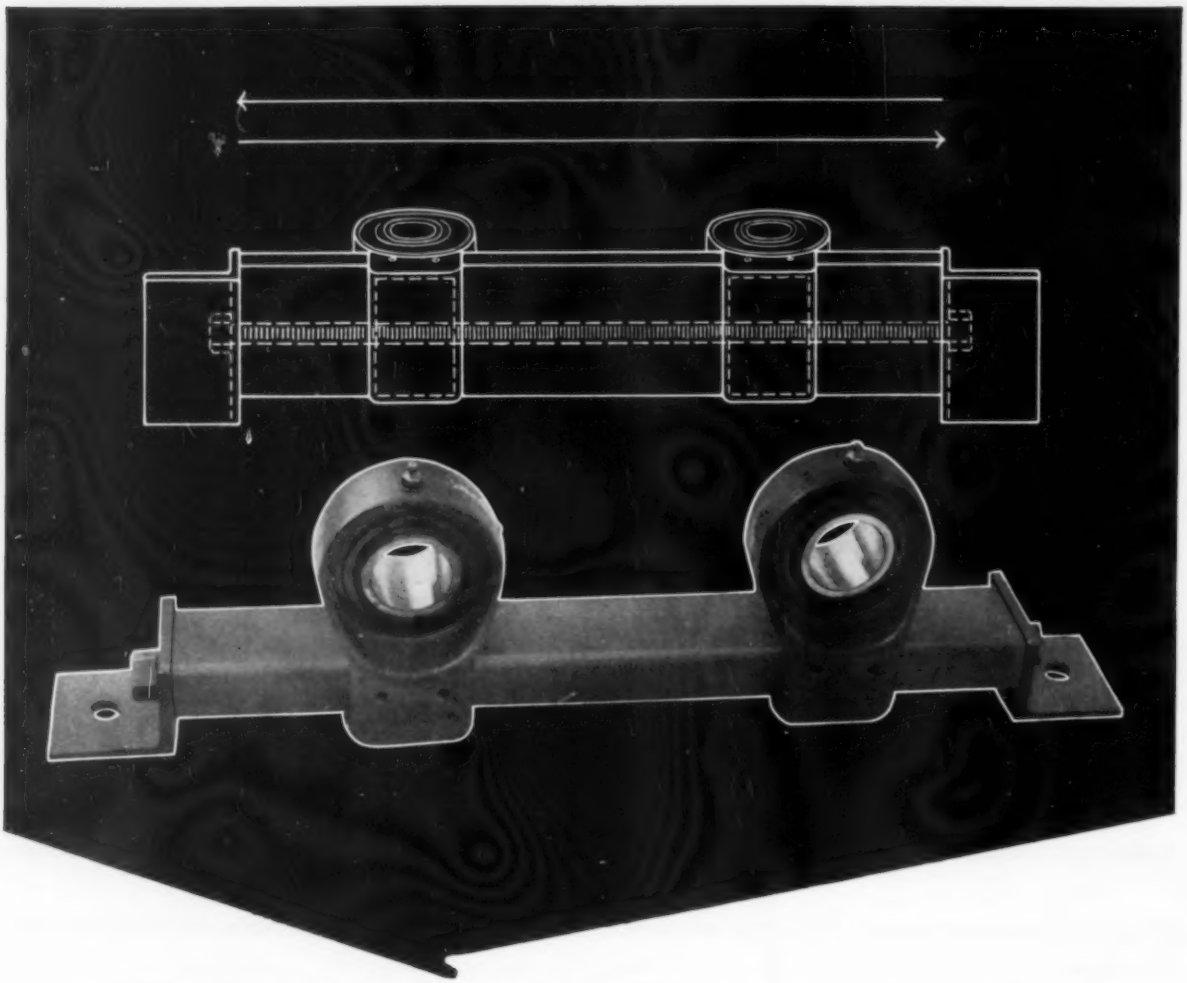
Volume 79 Number 3



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Southern Power & Industry

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Vol. 79
No. 3

MARCH, 1961

Unprofitable Puzzlement 22
Reliability Factors in Steel Usage 24
Salt Water Conversion Process — Florida 26
Closed Circuit TV Removes Guesswork — Louisiana 29
Centrifugal Pumps — Down Thrust of Vertical Units 30

AIR AND GAS CLEANING — Special Section 33-48
Catalogs and Bulletins — Free Literature Items 34
Buyer's Guide — Sales and Service Representatives 39

Silicon Rectifier and Controls — Tennessee 49
Controlling Absenteeism in Industrial Plants 50
Special Coating Solves Corrosion Problem — Florida 52
Bimetallic Heat Exchanger Tubes — Texas 64
Packaged Air Make-Up Units — South Carolina 65
Briefs from Annual ASME Meeting 67
Plastic Seal Rings for Severe Pumping Service — Texas 68
Stainless Steel Slip Rings Improve Motors — Tennessee 69

Stamping Cut Tooling Cost 32
Custom Lubricants 66
Floating Bottom Truck 66
No More Clogged Hoppers 72
Handling Flammable Products 72
Evaporation Rates Increased 73
Car Shaker for Wood Chips 73
Flexible Hose Stops Jitters 73

Facts & Trends 6
News of the South 14
Future Events 18
Industry Speaks 22
Timely Comments 24
New Product Briefs 74
Catalogs & Bulletins 80
Index to Manufacturers 94

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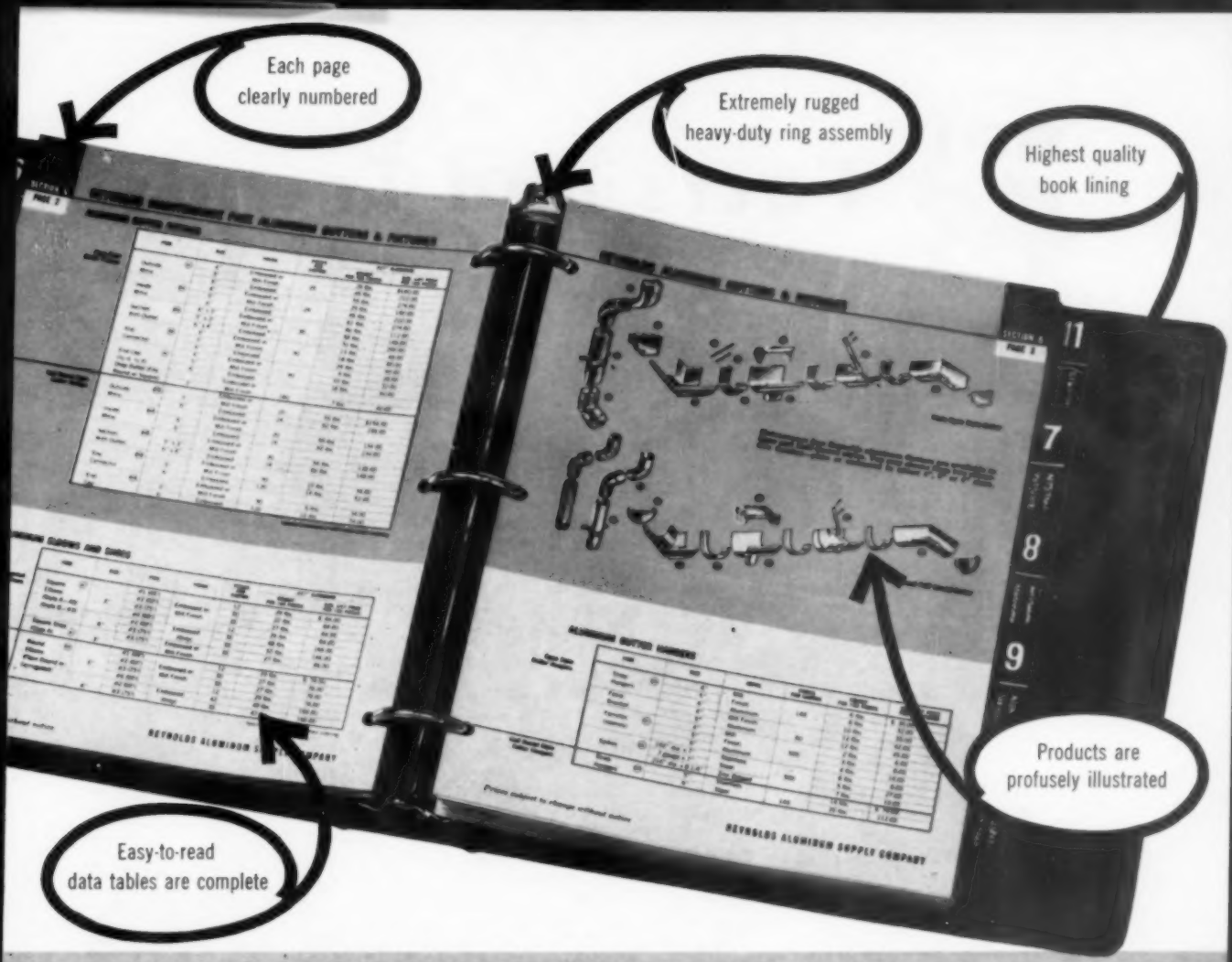

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Facts and Trends

March 1961

◆ WHAT! NO CAVIAR? — Ham and eggs, rather than canapes and libations of the proverbial hospitality suite, are being used by the Chemical Division of The Goodyear Tire & Rubber Company to entertain customers and potential buyers at trade shows and business conventions.

Since holding the first "early bird" affair in 1950 at the National Paint Show, the Goodyear breakfast has become an annual tradition at four major trade shows. The buffet-style breakfasts start at about 7:30 a.m. "We think a breakfast is more in keeping with the attitudes of professional salesmen," says H. R. Thies, division general manager.

◆ SEA WATER CONVERSION — A significant milestone to be achieved in 1961 will be marked progress in man's continuing efforts to make the oceans of the world a dependable source of fresh water.

That's the belief of Fred A. Loebel, president of Cleaver-Brooks Special Products, manufacturer of sea desalting equipment. "For 1961, we foresee a continuing downturn in water conversion costs. Experience being gained from large distillation units now operating will project new designs and techniques which will, in turn, further reduce desalting costs."

◆ COPPER RESEARCH — Vast new sources of copper ore have been discovered around the world during the past five years, and it is now evident that shortages of this useful metal need not be feared for at least the next few generations.

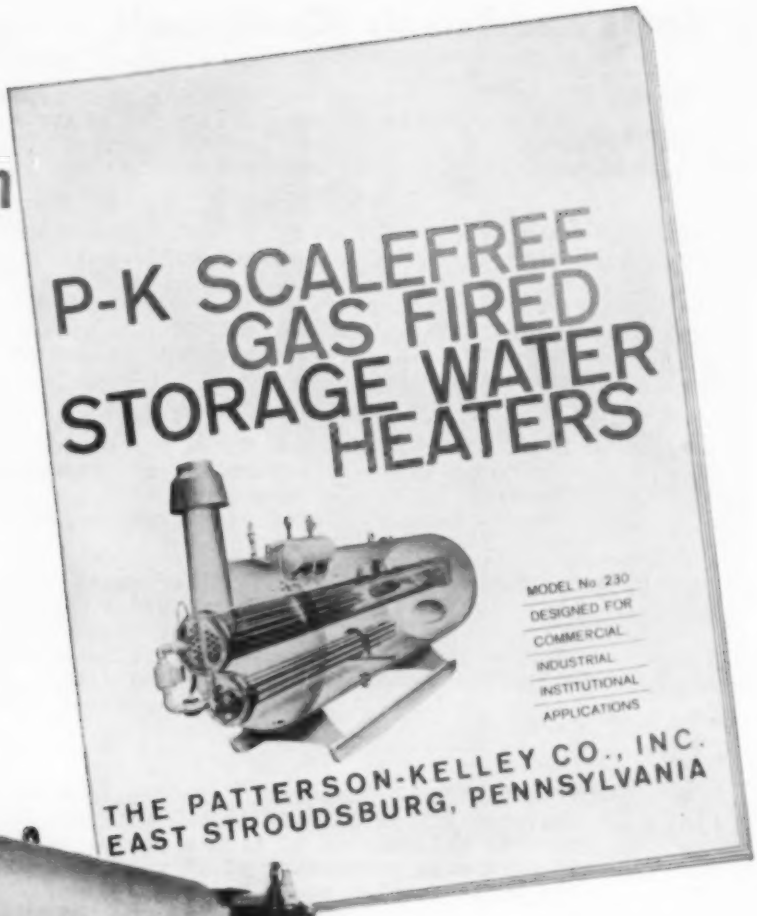
The United States copper industry emerged a year ago from a period of low output occasioned by an epidemic of labor strikes, only to find that foreign producers were taking up the small slack in the domestic market, and that general business conditions during 1960 did not favor an upturn in demand. Also competition from aluminum, plastics and ceramics is severe. The copper industry is addressing itself to the possibility of creating new markets through product research and development.

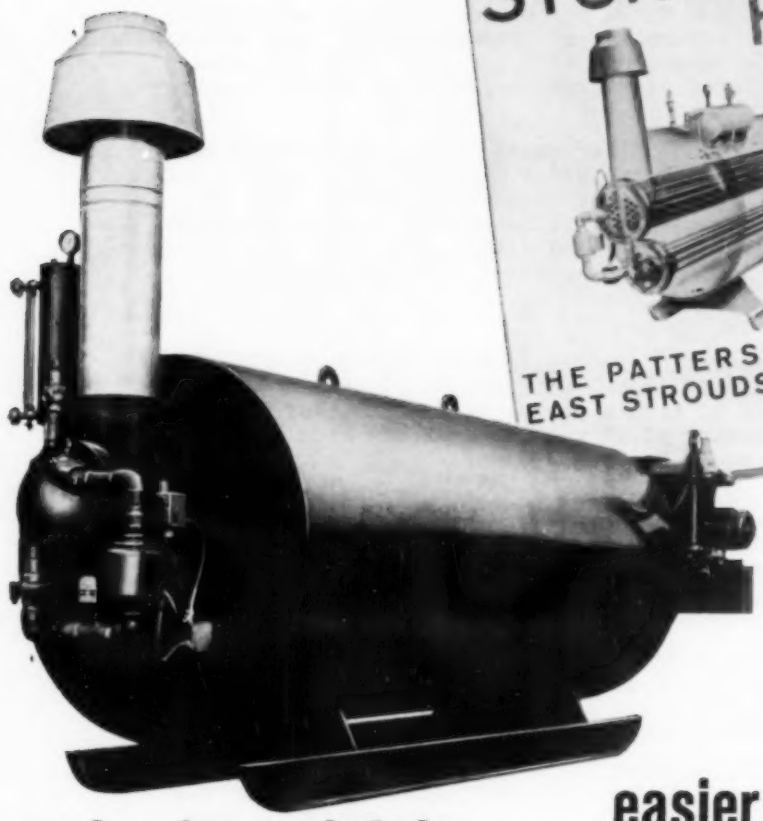
◆ FUEL CELLS — Six types of fuel cells that have proved feasible as electrical energy sources are evaluated in a 17-page Air Force research report now available to science and industry through the Office of Technical Services, Business and Defense Services Administration, U. S. Department of Commerce, Washington 25, D. C. — PB 161972.

The advantages and limitations of six types of fuel cells in converting chemical energy directly into electricity have been evaluated to determine their effectiveness as electrical energy sources. The report, which is written for use of technologists without a background in fuel cells as well as specialists in the field, defines a fuel cell as a d-c generator which produces energy directly from the chemical reaction between an oxidant and a fuel.

(Continued on page 8)

send for bulletin no. 4





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Striking new economies are now available for commercial, industrial and institutional buildings with P-K's SCALEFREE 230, the first indirect gas fired storage water heater • **Installation.** A complete and automatic package, P-K's SCALEFREE 230 can be skidded into place, hooked up and checked out quickly. There is no complicated piping or electrical work to run up costs. No stack is needed for extra draft. No foundation is necessary. Factory insulation (optional, as illustrated) further reduces costs and avoids the complications of on-the-site insulating. • **Maintenance.** P-K'S SCALEFREE 230 offers new freedom from trouble. It won't scale—and retains its rated efficiency—because heat transfer occurs below the temperature at which scaling minerals precipitate. Linings of Pre-Krete® or copper keep the storage section free of rust and corrosion regardless of water conditions. • P-K'S SCALEFREE 230 is available in storage capacities from 250 to 4,000 gallons; recovery sections from 390,000 to 2,215,000 BTU. Bulletin No. 4 gives complete engineering and performance data. Address your request to: The Patterson Kelley Co., Inc., 63 Morgan Avenue, East Stroudsburg, Pennsylvania.

Patterson Kelley
Water Heater Division

Facts and Trends (Continued)

◆ UNEMPLOYMENT — Chances are that the unemployed persons you may know are youths no more than a few years out of school or persons who have never learned carpentry, bookkeeping, shorthand, nor for that matter any other skill, or are non-white.

Everyone would like to see better employment prospects. But actually, the Bureau of Labor Statistics at Washington foresees higher levels of unemployment. There is a debate going on in Congress, on the air and in the press about reducing poverty by raising the minimum wage. But if the young, the unskilled and the non-whites cannot find enough jobs under existing wage rates it is not likely they will find jobs under higher rates.

◆ HIGH TEMPERATURE FURNACE — Fused stabilized zirconia refractory, a valuable military and industrial research tool since its development by Norton Company in 1951, has recently been placed in service in its first commercial application as a refractory for furnace construction.

The furnace designed to operate continuously at elevated temperatures in the vicinity of 3992 F has been built by C M Manufacturing & Machine Company of Bloomfield, New Jersey. The heating elements are specially selected and machined tungsten rods. The furnace can be operated with hydrogen or other reducing or inert atmospheres compatible with the furnace materials.

◆ DECONTAMINATION — Disposal of radioactive waste likely presents the greatest difficulty in the path toward practical commercial utilization of atomic power. We use a lot of power and if any large percentage of it were produced by atomic plants the waste problem would become formidable.

So far there is no known reversible action to "unwind" radioactivity. Only time will do it — and it takes a lot of time. Imagine the growing problem of finding safe burying places for such waste if we really do build great numbers of atomic power plants. There is hope, however. Most processes are reversible - so there may be an answer. Can the scientists find it?

◆ MILLIONS FOR KILOWATTS — Georgia Power Company has announced the greatest construction budget in the firm's history — a scheduled 1961 expenditure of $59.5 million.

John J. McDonough, president, also reported Georgia's economic expansion for the next three years will increase demands for electric power by more than a billion kilowatt-hours a year. One of the company's top 1961 projects will be continuing construction on Plant McDonough near Atlanta. This 500,000 kilowatt project was started in 1960 and will cost approximately $66 million when completed in 1964.

◆ LINING STEEL PIPE — A new and economical method for applying seamless, corrosion-resistant vinyl lining to interior walls of steel pipe has been developed by Lithcote Corporation, Melrose Park, Ill.

A special roller-coater is used to apply a Geon vinyl plastisol coating to the interior walls of pipe ranging from 3 inches to 36 inches in diameter and in lengths up to 60 feet. The plastisol lining thus applied is from 1/16 to 1/8 inches thick. It is heat fused to the pipe in a specially designed oven.

(Continued on page 10)

Crew installs Armco SMOOTH-FLO Sewer Pipe for an industrial outfall in the coastal tidelands of the South.

Armco SMOOTH-FLO Pipe Offers Many Advantages for Industry

Combines Peak Flow Capacity with Flexible Strength

Steel — For strength, economy, durability

Because of the interior smoothness of Armco SMOOTH-FLO® Pipe, you get peak flow capacity—unsurpassed by any other kind of drainage structure. Armco SMOOTH-FLO is completely coated at the mill with a special asphalt. Then it is fully lined with a centrifugally-applied asphalt paving—covering all interior corrugations. This minimizes danger of damage through chemical or erosive attack.

Armco SMOOTH-FLO has ample flexible strength to withstand various loading conditions. Its positive joints assure a continuing integral structure.

This corrugated metal pipe is supplied in a wide range of diameters. Write us, or call your local Armco Sales Engineer for further details. Armco Drainage & Metal Products, Inc., P. O. Box 1343, Atlanta 1, Georgia.

ARMCO Drainage & Metal Products

Facts and Trends (Continued)

◆ PRODUCTS & DISTRIBUTION — Two new company officers are coming into prominence, as producers gird for the anti-recession battle. One is the product manager; the other, the director of physical distribution.

The product manager is charged with the responsibility for keeping each part of the company's product line up-to-the-minute in pricing, design and marketing technique. To get new products, American companies are budgeting $10 billion for research and development during 1961. The director of physical distribution will integrate the activities of traffic management, material handling, packaging, shipping and receiving, finished-goods inventory control, warehousing and truck-fleet operation. About four times as many companies will appoint a director of physical distribution in 1961 as were appointed in the past five years.

◆ WATER POLLUTION — "We have no pollution problems that require any additional federal controls . . . Enforcement is the primary concern of the state." So said 70 per cent of the 1,145 persons associated with water supply, pollution control, public health, and industrial, recreational and agricultural interests that attended the federally sponsored National Conference on Water Pollution held in Washington, D. C.

There is, however, every reason to expect that Congress will be asked to provide over $100 million annually for federal grants to municipalities for the construction of sewage treatment facilities. This would be in addition to funds that would be requested to finance the increased research, expanded river monitoring system, establishment of regional Public Health Service research laboratories, and enlarged public education programs which advocates of an expanded federal program say are essential.

◆ ELECTRICAL INSULATION — A new modified polybutadiene polymer with a unique combination of properties has been announced by B. F. Goodrich Chemical Company. Hycar 1000X145 has excellent abrasion resistance and will not become brittle even at temperatures as low as -85 F. It also has moderate resistance to the effects of fuels, solvents and chemicals.

BFG engineers point out that characteristics of the new polymer, including excellent electrical properties and ozone resistance, make it an ideal material for use in the electrical wire and cable field. Hycar in wire and cable applications may eliminate the need for use of two different materials in the primary insulation and protective sheath.

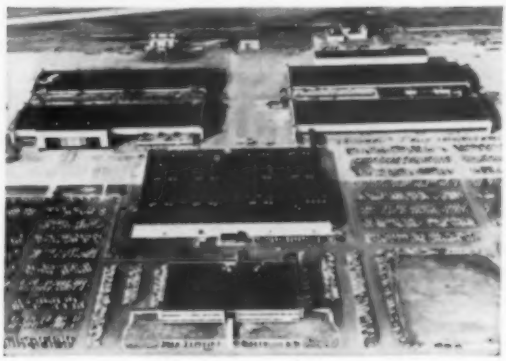
◆ SUPERVISORY TRAINING — Three new films for supervisory training have just been announced by Modern Management Films, a division of The Bureau of National Affairs, Inc., 1231 24th Street, N.W., Washington 7, D. C. Suitable for office or plant supervision the films are short, 16-mm sound and color motion pictures, designed to teach basic principles of supervision and stimulate discussion of supervisory problems.

With the addition of these three films, the Modern Management Film series now provides training aids for four important problem areas of supervision: (1) giving orders and instructions; (2) listening; (3) motivating employees for higher productivity; and (4) leadership. Each film is accompanied by a Leader's Guide to assist in conducting a training meeting.

(Continued on page 12)

American Airlines' Jet Maintenance and Engineering Center, Tulsa Municipal Airport

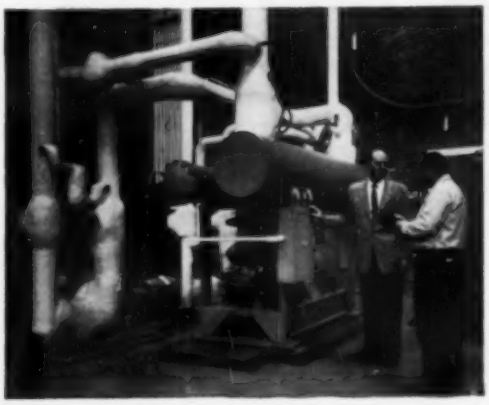
In the jet age ...it's Acme



American Airlines has "staked out" its claim on the jet age with a $20,000,000 expansion program at the AA Jet Maintenance and Engineering Center, Tulsa Municipal Airport (above). Under the program almost 600,000 square feet of space have been added . . . new shops for turbine engine overhaul, fuel control, jet airplane overhaul, jet test cells, to mention a few. And at a cost of some $3.5 million, more than 15,000 kinds of new items for jet age service and maintenance have been gathered at the Jet Center.

You name it . . . ultrasonic cleaners, mass spectrometers, automatic pilot mock-up. American has it . . . the finest, most modern equipment there is, including Acme Packaged Chillers. In fact, in four areas . . . jet fuel control testing rooms, standards laboratory, gyroscope overhaul shop and two new jet engine test cells . . . where air conditioning and humidity control requirements are critical, you'll find ever-dependable Acme chillers at "the heart" of the systems.

Yes, for delivering "the goods". . . for minimum-maintenance, trouble-free performance you can *depend* on Acme. Ask an Acme user . . . ask Hugh E. Gallemore, Manager of Facilities Maintenance at the Jet Center.



Acme INDUSTRIES, INC.

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Manufacturers of quality air conditioning and refrigeration equipment since 1919

Facts and Trends (Continued)

◆ MOTORIZED CRANE KITS — A new line of crane kit components offered by Cleveland Beacon Products Co. provides customers with motorized cranes in minimum time.

Built "on the job" at time of erection with locally purchased structural beams, top-running and under-running types include precision aligned individual driven end trucks, controls, instructions and mounting details. Capacities are to 6 tons; spans to 40 feet; 50 to 140 fpm bridge speeds including adjustable ballast resistor controls for smooth acceleration.

◆ COMPUTERS & PLANNING — Rigorous planning and intelligent administration are essential if American business firms are to make successful use of electronic data processing, the National Industrial Conference Board reports in releasing a study of the administration of computer systems.

The NICB study draws on the collective experiences of 124 companies of all types and sizes. It describes how these companies have managed their computer programs from their inception to the final establishment of computer departments that routinely process great volumes of data, maintain records, and issue documents and reports. The report brings together the experience that has been gained through hundreds of man-years of study and actual computer operations. Write: Director of Public Information, National Industrial Conference Board, 460 Park Ave., New York 26, N. Y., for "Administration of Data Processing, No. 98."

Write the editors for additional information on any of the above items. SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 8, Ga.

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◆ REPRINTS AVAILABLE — Write the editors of SPI for small quantities of the following at no charge:

SEGCO 1,000,000 KW PLANT — A 16-page folder describing this large new Alabama plant, serving Alabama Power Co. and Georgia Power Co., is a combination of two technical articles from SPI's September and November issues.

HOW EPOXY CAN SERVE YOU — 4 pages. Tells exactly how 10 separate repair jobs were handled and describes several epoxy mixes that are good for maintenance jobs.

ORIFICE METER INSTALLATIONS — Tells what the plant man needs to know about installation to get accurate, dependable service.

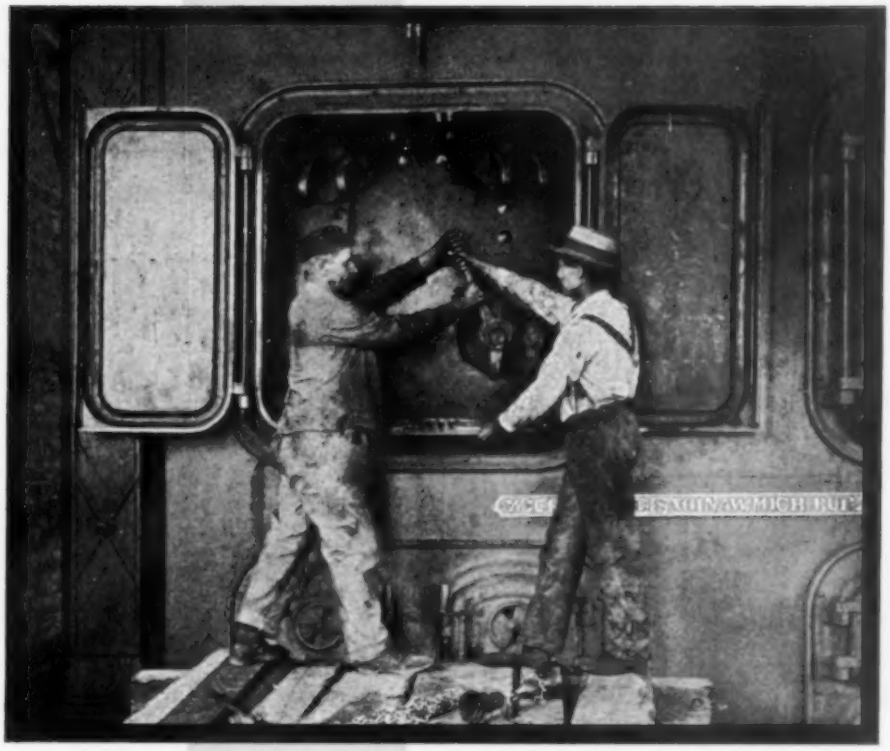
INSPECTION REPORTS — Tells how the station chemist can maintain information on the condition of boilers, cooling towers, condensers, heat exchangers, tanks and softeners. Actual inspection sheets are presented.

ELECTRICAL DISTRIBUTION FOR LARGE PLANT — An 8-page special report prepared jointly by Director of Facilities, the Consultants, and the Contractor — describing plans and installation of all electrical services for new plant of Texas Instruments Inc., Dallas, Texas.

THERMAL INSULATION DIRECTORY:
Tells where to get service and technical data.....6 pages

WATER TREATMENT DIRECTORY:
Tells where to get service and technical data.....12 pages

AIR & GAS CLEANING DIRECTORY:
Tells where to get service and technical data.....16 pages

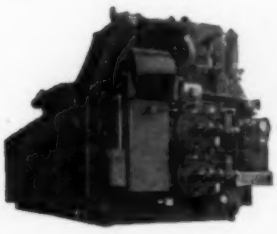


This boiler, built by Wickes Boiler Co. in 1875, operated satisfactorily for the next 31 years.

When buying modern Boiler Equipment it pays to deal with an *EXPERIENCED MANUFACTURER*

There is no substitute for experience. From the first pioneering days in boiler manufacture, years before the boiler pictured above was built, Wickes Boiler Co. has continued to be a world leader in the development of economical, efficient and dependable steam generators. Today, Wickes builds steam generators in sizes to 500,000 lbs. of steam per hour, for high or low steam pressures and temperatures and for all types of fuels and firing methods.

A Wickes steam generator, custom engineered to exact generating requirements, is built to the highest standards of workmanship, backed by over a century of boiler making experience.



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WICKES

175

WICKES BOILER CO.

DIVISION OF THE WICKES CORPORATION, SAGINAW 14, MICHIGAN

the SOUTH—SOUTHWEST

more power . . . more plants . . . more money

Hardboard Siding Plant For Armstrong — Georgia

Construction of new facilities for the manufacture of hardwood siding is underway at the **Armstrong Cork Company's** fiberboard plant in Macon, Georgia. The new buildings, which will add about 60,000 square feet of floor space, are expected to be in operation by August, 1961.

H. R. Peck, Vice-President and General Manager of Building Materials Operations for Armstrong, said the Macon Plant will begin turning out a new line of high grade, primed hardboard later this year for use as exterior siding on new homes. The product will be made from tough willow and cotton hardwoods, and will have outstanding strength and weathering characteristics. It will be manufactured in both strip form and in pre-scored panels.

Armstrong plans to market the siding nationally through lumber and building materials dealers. In addition to the manufacturing buildings now under construction, portions of the main plant are also being converted for cotton and willow wood processing.

The new facilities constitute the third major addition to Armstrong's Macon plant in four years. Established in 1948, the plant now contains nearly a million square feet of floor space, most of which is under one roof. It is considered one of the largest fiberboard producing plants in the world.

Vought Electronics Moves Into New Plant

The Electronics Division of **Chance Vought Corporation** recently began operations at its new multi-million dollar, 80,000 sq ft air conditioned building between Dallas and Fort Worth, near Arlington, Texas. The move was planned to take place without any interruption of production schedules.

Benjamin H. Ciscel, general manager of the Division, said the new facility is especially tailored for production of precision electronics systems, and will permit more efficient operation and lower production cost.

Colbert Steam Plant — Ala.

A Rockwell-Republic solid-state electronic combustion control system will be applied to the steam generator of a new 500-megawatt generating unit for TVA's Colbert Steam Plant Unit No. 5 at Tuscumbia, Alabama.

Receipt of the prime contract for the automatic combustion control, analog instrumentation and digital data system has been announced by Republic Flow Meters Company, a subsidiary of Rockwell Manufacturing Company. TRW Computers Company, a division of Thompson Ramo Wooldridge, Inc., will provide the digital data system with an RW300 computer.

Transistorized, miniaturized Republic equipment will control coal pulverizers, fans, and feedwater for the steam generator. The generator has a capacity of 3,900,000 pounds per hour and operates at 2450 psi and 1053 F. The TRW computer will scan 600 operating variables, signal off-normal operations, and print out data as required by operating personnel.

PLANT PERSONNEL

At Bowaters Southern Paper Corporation, Calhoun, Tenn., **John K. Dyer** has been named production manager-pulp; and **Walter J. Parson,** production manager-newsprint. **L. E. Culbertson** is Southern mill manager.

Walter C. Archinal has been promoted from research chemist to superintendent of coatings production

at Metal & Thermit Corporation's Carrollton, Kentucky plant. Prior to joining M&T in 1959, Mr. Archinal was employed by the Rubber Corporation of America.

Jay S. Handley has been elected vice-president in charge of all drill-

GENERAL

RODA COKE — High carbon — low sulphur — low phos. Unmatched for reduction purposes.

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•

WESTMORELAND COAL COMPANY

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JEDDO-HIGHLAND COAL COMPANY

Coals differ in their characteristics — that's why General strives to make sure you get the proper coal for your particular application. We endeavor to insure that every car of coal we ship meets the specific need for which it is intended.

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NEW HIGHLANDER

automatic boiler-burner plant

Choice of Hev-E-Oil, Hev-E-Duty gas or combination gas and oil burner

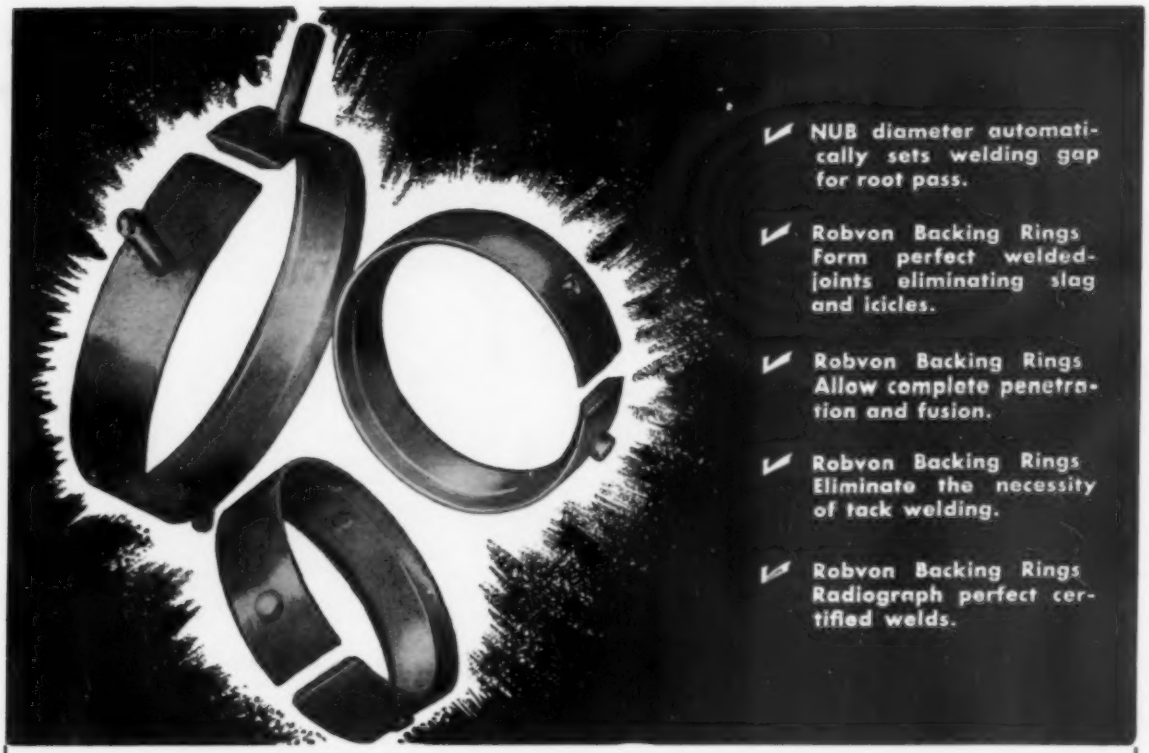
You can rely on this completely automatic unit for *all* heat or power applications. It is built for low pressure or high pressure use — burner to match for heavy oil, light oil, or combinations of gas/light or gas/heavy oil.

The new Highlander is a completely assembled boiler-burner plant (Scotch-type two-pass unit). This combination of boiler and burner brings out the best in operating efficiency and reliable performance. *Simple!* Just two flue passes. *Easy maintenance!* Boiler interior easily accessible. *Reliable!* Complete plant is carefully tested at the factory. *Guaranteed!* Each unit carries a certified rating for output. Entire unit bears Fire Underwriter's label. Write today for complete information — Dept. SPI-120.

HEART OF THE HIGHLANDER is the famous Industrial Combustion Burner. Shown is the HEV-E-OIL Burner especially engineered to make use of inexpensive heavy oils. Available from 5 to 150 gph. HEV-E-DUTY POWER GAS BURNERS and combination gas/oil burners in sizes from 720,000 to 21,000,000 Btu.

INDUSTRIAL COMBUSTION INC.

EXECUTIVE OFFICES: 4507 N. OAKLAND AVE., MILWAUKEE 11, WIS.



- NUB diameter automatically sets welding gap for root pass.
- Robvon Backing Rings Form perfect welded-joints eliminating slag and icicles.
- Robvon Backing Rings Allow complete penetration and fusion.
- Robvon Backing Rings Eliminate the necessity of tack welding.
- Robvon Backing Rings Radiograph perfect certified welds.

ROBVON BACKING RINGS

APPROVED FOR WELDED PIPE, VALVES, AND FITTING JOINTS

Available in carbon steel, wrought iron, chrome alloys stainless steel, aluminum and copper

TYPE CCC Designed for quick easy alignment of pipe where the variation in inside diameters is relatively great. Chamfered NUBS allow close tolerance fit-up and CLEAN STRIKE OFF. ROBVON rings are beveled to assure non-restricted fluid flow.

TYPE CC Designed to allow quick easy alignment of pipe where the inside diameters are slightly out of round. The welder has the choice of "STRIKING OFF" the NUBS or leaving them intact to be melted into the weld mass of the first root pass.

TYPE C Designed for precise close tolerance fit-up. Type "C" NUBS automatically sets root gap. The NUBS melt with the metal to give complete penetration and fusion.

Robvon also manufactures machined rings to customer's specifications
All fabricated solid machined rings x-rayed. Write for full information

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BACKING RING COMPANY

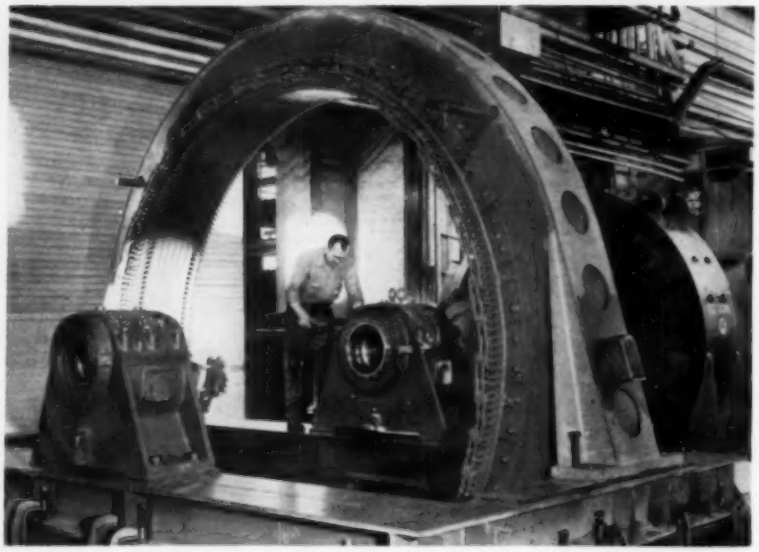
675 GARDEN STREET ELIZABETH, NEW JERSEY

ing and production operations for Texas Gas Exploration Corporation at Houston.

William O. Davis has been named manager of Texas Gas Transmission Corp.'s pipe line division at Memphis, Tenn., where he is responsible for maintenance, dispatching and housing. He was formerly manager at Lake Charles, La. At the Owensboro, Kentucky, headquarters **Wayne Sweet** is now assistant superintendent of the measurement department.

James V. Barker has been promoted to superintendent of construction for Virginia Electric and Power Company at Richmond. Mr. Barker, who was previously assistant superintendent, succeeds **Ivan Buys**, who has retired.

Managers of newly created branches within Chance Vought Corp.'s Electronics Division at Arlington, Texas, are: **J. H. Boucher**, Automatic Controls; **G. T. Litton**, Electronic Systems; and **E. M. Humphries**, Guidance Systems. They will report to **R. N. Hutson**.



Largest Grinding Mill Motor

This stator with base and bearings is for the largest grinding mill motor ever built. Inside diameter of the stator is 137½".

Four of these 3000-hp, 200-rpm Allis-Chalmers synchronous motors will be used to drive 12- by 36-ft Compeb mills at a Florida installation. The motors use Super-Seal insulation to withstand high temperatures, shock and vibration, and abrasive dusts.

FUTURE EVENTS of Engineering Interest

March 5-7: Southern Safety Conference & Exposition, Atlanta Biltmore Hotel, Atlanta, Ga. W. L. Groth, Exec. Dir., Box 8927, Richmond 25, Va.

March 12-17: Public Meeting, ASME Boiler & Pressure Vessel Committee, Barringer Hotel, Charlotte, N. C. Secretary, American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y.

March 15-17: 40th Annual Convention, Natural Gasoline Assn. of America, The Baker Hotel, Dallas, Texas. Wm. F. Lowe, Exec. Dir., 421 Kennedy Bldg., Tulsa 3, Okla.

March 15-17: 24th Annual Short Course for Superintendents & Operators of Water & Sewerage Systems, Louisiana State University, Baton Rouge 3, La. Fred H. Fenn, Dean, College of Eng.

March 21-23: 23rd Annual American Power Conference, Sherman Hotel, Chicago. Dr. Roland A. Budenholzer, Dir., American Power Conference, Illinois Institute of Technology, Chicago 16, Ill.

March 27-28: 3rd Annual Production Institute, University of Wichita, Wichita 8, Kans. Prof. B. M. Aldrich, Coordinator.

April 5-7: AIEE Southeast District Meeting, Jung Hotel, New Orleans, La. Sec'y American Institute of Electrical Engineers, 33 West 39th St., New York 18, N. Y.

April 10-13: ASME Oil & Gas Power Division Conference & Exhibit, Jung Hotel, New Orleans, La. Edward L. Satola, Pub. Chm., Nordberg Mfg. Co., 3073 S. Chase Ave., Milwaukee 1, Wis.

April 12-13: AIEE Materials Handling Conference, Hotel Sheraton, Philadelphia, Pa. H. A. Zollinger, Chm. AIEE Materials Handling Subcommittee, Westinghouse Electric Corp., Pittsburgh, Pa.

April 19-21: 7th Southeastern Regional Conference & Instrument Exhibit, Instrument Society of America, Park Center & Public Library, Charlotte, N. C. Eugene B. Finch, Exhibit Chairman, Rt. 2 —Box 673C, Charlotte 9.

April 20-21: Annual Meeting, American Society for Engineering Education, Oxford, Miss. Charles E. Gearing, Chm. RWI Membership Comm., S.E. Section ASEE, Dept. of Engineering Ext., Auburn University, Auburn, Ala.

April 28: Oklahoma Regional Meeting, Natural Gasoline Assn. of America, Lake Murray Lodge, Ardmore, Okla. Wm. F. Lowe, Exec. Dir., 421 Kennedy Bldg., Tulsa 3, Okla.

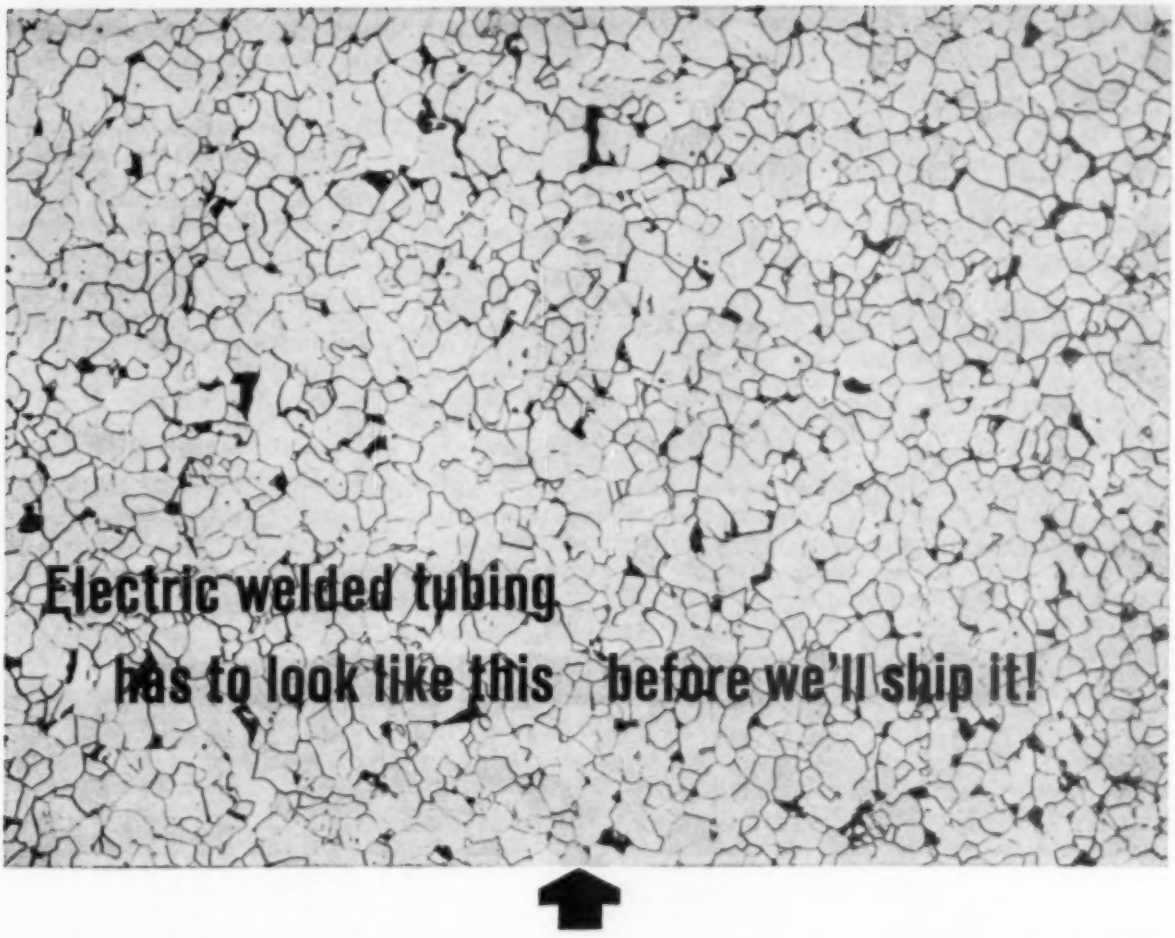
May 19: Permian Basin Regional Meeting, Natural Gasoline Assn. of America, The Lincoln Hotel, Odessa, Texas. Wm. F. Lowe, Exec. Dir., 421 Kennedy Bldg., Tulsa 3, Okla.

(*Continued on Page 20*)

This mark tells you a product is made of modern, dependable Steel.

Portrait of a perfect weld

Magnification—100X; Etch-Picral Nita



In this photomicrograph of a section of USS National Electric Resistance Welded Steel Pressure Tube the weld section runs right down through the center of the picture above the arrow. The consistency of structure between the weld area and the rest of the tube shows that USS National Welded Pressure Tubes have an important attribute—dependability.

Pressure tubes must be dependable. In the fabrication of heat transfer equipment—boilers, heat exchangers, condensers, superheaters and economizers, it is imperative that each tube be dependable, the entire installation is only as reliable as the weakest tube.

At National Tube we use metallographic examination, non-destructive ultrasonic testing, hydrostatic testing and thorough visual inspection to insure consistent dependability.

National Tube Distributors all over the nation maintain stocks of USS National Electric Welded Pressure Tubes in sizes from ½″ O.D. x .035″ wall to 5½″ O.D. x .250″ wall and in lengths to 44 feet. Our Engineering Service Force is available to you for field consultation. For further information, write or phone National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

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National Tube Division of United States Steel

USS

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • United States Steel Supply Division • United States Steel Export Company, New York

Diesel Facilities Completed at Norfolk

Diesel Injection Sales & Service, Inc., recently opened its new headquarters office and shop at 1120 East Brambleton Ave., Norfolk, Virginia.

The building encompasses approximately 28,000 sq ft of floor space. Construction is of steel, masonry and non-combustible material. It is fully insulated and has special metal pan ceilings for noise control. Huge doors to accommodate entrance of large diesel vehicles and machinery have been provided in the engine rebuilding section.

In addition to facilities and equipment to rebuild and repair diesel engines, an instrument repair department, a hydraulics service department, and an electrical repair shop have been included in the new plant. The latest in contemporary design is incorporated in the modern office lay-out and the glass-enclosed sales display and exhibit area.

ASEE Meeting — Miss.

The next annual meeting of the **American Society for Engineering Education** will be held April 20-21 in Oxford, Mississippi. The Relations With Industry Division activities at this meeting will include a get-acquainted party Wednesday evening, April 19; breakfast Thursday morning, and group meeting that afternoon. Papers to be presented Friday morning will be one on cooperative education programs at the graduate level, and another on post baccalaureate study for industrial personnel.

The meeting provides an opportunity for college and industrial members to exchange ideas. Charles E. Gearing of the Department of Engineering Extension at Auburn University in Alabama is chairman of the Southeastern Section RWI membership committee.

ASME — New Orleans

"Engine Fuels and the Future" will be the theme of the **ASME Oil and Gas Power Division** Conference and Exhibit to be held April 10-13 at the Jung Hotel in New Orleans.

The Technical Program Committee reports that papers to be presented should appeal to the interests of everyone concerned with internal combustion engines, including engine builders, users, and suppliers. Many phases are covered, from technical treatises to practical case histories by operating personnel. The exhibits will present new ideas and products, and major advances will be discussed. Social events have been planned by the New Orleans Section.

ASME — Charlotte

A public meeting of the Boiler and Pressure Vessel Committee of **The American Society of Mechanical Engineers,** will be held in Charlotte, North Carolina, March 12-17. The meeting, at the Barringer Hotel, will be held jointly with the National Board of Boiler and Pressure Vessel Inspectors.

The Committee writes the safety code governing construction and installation of boilers and pressure vessels in most of the United States and Canada.

Subcommittees dealing with power and heating boilers and unfired pressure vessels, such as gas storage tanks, will hold sessions during the week. An all day meeting of the full committee is scheduled for the final day of the meeting.

American Power Conference

Sessions devoted to the creation of energy through nuclear fission will be featured at the 23rd annual **American Power Conference,** to be held March 21-23 at the Sherman Hotel, Chicago.

More than 100 technical papers will be presented during 31 sessions comprising the conference, sponsored by Illinois Institute of Technology in cooperation with nine national technical societies and 14 universities.

The conference will include discussions concerning the super-critical electric power stations, and sessions devoted to the future of nuclear energy and the most promising methods of generating power from nuclear fission.

More than 3,000 industrial and electric utility executives, engineers, educators and government officials are expected to attend.

Reynolds Metals Offers Structural Erection Service

A structural erection service has been set up at Reynolds Metals Company's structural fabrication plant at Phoenix, Arizona, headed by Charlie F. Weed, a civil engineer from the Reynolds reduction plant at Sheffield, Alabama.

In production for less than two years, the structural fabrication plant has been producing aluminum transmission towers, switch yard structures and other heavy structural aluminum units.

The bulk of the plant's production, plant manager John Maples said, has been in switching stations and aluminum transmission towers. Although these towers range up to 100 feet tall, aluminum's light weight makes it practical to do much of the fabrication at the Phoenix plant with subsequent time and money saving at the job site. In some cases helicopters have been used to set up the aluminum towers in rough country.

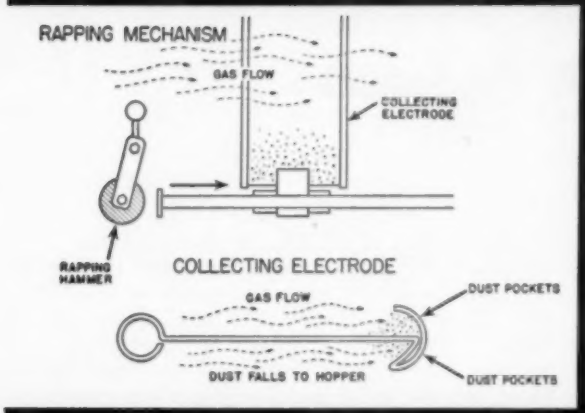
This new erection service is expected to be of material aid in realizing the tremendous potential of large aluminum structures. Aluminum towers and substations, for example, can be almost completely assembled in the shop instead of on the site. They are also more easily transported and at much lower freight costs. The heavy structural units make use of the flexibility of the extrusion process to put the strength where it is needed.

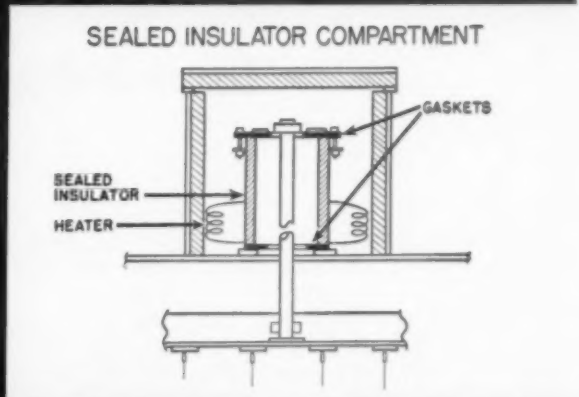
(*Continued on Page* 89)

SOME PLAIN FACTS

ABOUT SUPERIOR PRECIPITATOR PERFORMANCE

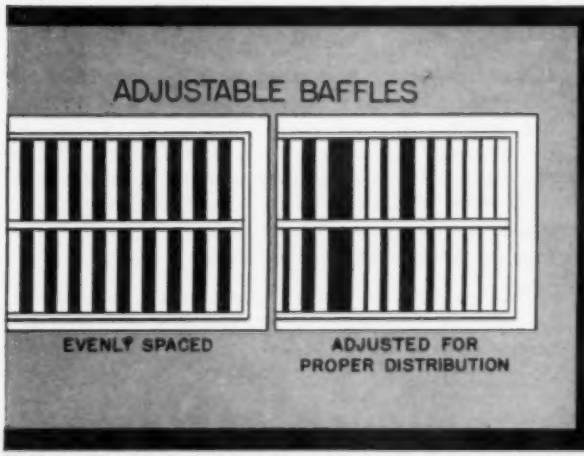
Buell Precipitators are designed and constructed for rugged service and superior performance. Frills and internal frim-fram of a doubtful value are eliminated in favor of strength and simplicity. The casing, outside supports, and internal parts are of rugged construction; and the four-point suspension of emitting electrodes ensures the greatest stability. Here are just a few of the outstanding features of Buell Precipitators.





Effective Continuous Cycle Rapping—Yes, it's mechanical. A simple, rugged system free of complicated gadgets; assures positive dust shearing action. Each row of electrodes is rapped separately—in the direction of the gas flow—on a continuous cycle. Dust is sheared off, drops in an agglomerated mass and pockets on electrodes minimize reentrainment.

Sealed Insulators Improves Operation—High voltage quartz support insulators are completely sealed; prevents gas and dust leaking into insulator compartment and outside air leaking into precipitator. There is no need for costly ventilating systems. Thermostatically controlled electric heaters insure start-up without danger of moisture condensation and insulator breakdown.



Uniform Distribution of Gas Flow—Field adjustment capability is vital. Buell's adjustable baffle permits final positioning after field measurement of actual flow distribution . . . because gas flow patterns are not entirely predictable. The Buell distribution system assures equal gas loading through the precipitator; eliminates ineffective "dead" areas around passages and prevents "sneak-by."

Buell Spiralectrodes cut maintenance to a minimum. Buell's record stands at less than 1% replacement in this key area. Self-tensioned spiralectrodes eliminate vibration and "off-center" swaying, often prevalent with weight-tensioned wires. They're structurally fixed and once installed stay in alignment. The spiralectrode provides greater emission than straight wires.

Buell precipitators are simple and effective. They're designed for continuous service. You'll be glad you turned to Buell when you experience superior performance and low maintenance. Detailed literature describing all features is available.

buell Norblo

The Buell Engineering Co., Inc., Dept. 80-C, 123 William Street, New York 38, N. Y. Northern Blower Division, 6422 Barberton Avenue., Cleveland, Ohio. ■Electric Precipitators ■Cyclones ■Bag Collectors ■Combination Systems ■Fans ■Classifiers.

INDUSTRY SPEAKS

The Unprofitable Puzzlement

ROGER M. BLOUGH, chairman of U. S. Steel, speaking before the Los Angeles Chamber of Commerce, observed that there must be more profit in the American business system or the lack of it will bring about "fewer jobs for new workers and a less competitive America — less competitive with Russia and with the world.

"Why," he asked, "when profit is so important to everyone, do so many — or is it only the vocal few — criticize and down-grade profit? Why is there so much misunderstanding about profit? Why do some well-meaning people dislike and distrust profit?" He asked why businessmen so often apologize for profit and allow it to be "pinched, squeezed, siphoned away, perhaps even slowly destroyed."

Stating that profits are required to maintain productive equipment and provide greater job security, Mr. Blough pointed out that "we encounter constantly the mistaken notion that profit is something a few siphon off to the detriment of the many." This old wives' tale should have been laid to rest years ago. Profit is the source by which the lot of the many is improved. Everyone making an impartial and serious study of business knows there is a legitimate function for every penny of profit—that profits are hard working and work for everyone.

Discussing the effects of profits on jobs, Mr. Blough indicated that "there are those who think of profit as something which weakens their jobs under certain conditions." The reverse is obviously true. Nothing hurts jobs as much as lack of profit. Certainly one of the most unhappy symptoms and direct by-products of the profit squeeze is painful unemployment. Certainly the food that nurtures jobs is profit.

"No one can, or should, guarantee that you or your stockholders or your employees will be associated with a profitable enterprise. To be continuously more and more competitive is your job and mine. That is why we have been given what sometimes seems the rather trying task of making ends meet when they just don't seem to want to meet.

"How should we be more competitive? There are right ways and there are ways not so right.

"The right way to become more competitive is through the true and lasting benefits of cost reduction and the price reduction that follows cost reduction. When, through methods and equipment improvement, better products can be produced at lower cost and thus sold at a lower price, nothing could be better. It is the profit and loss system working on all eight cylinders."

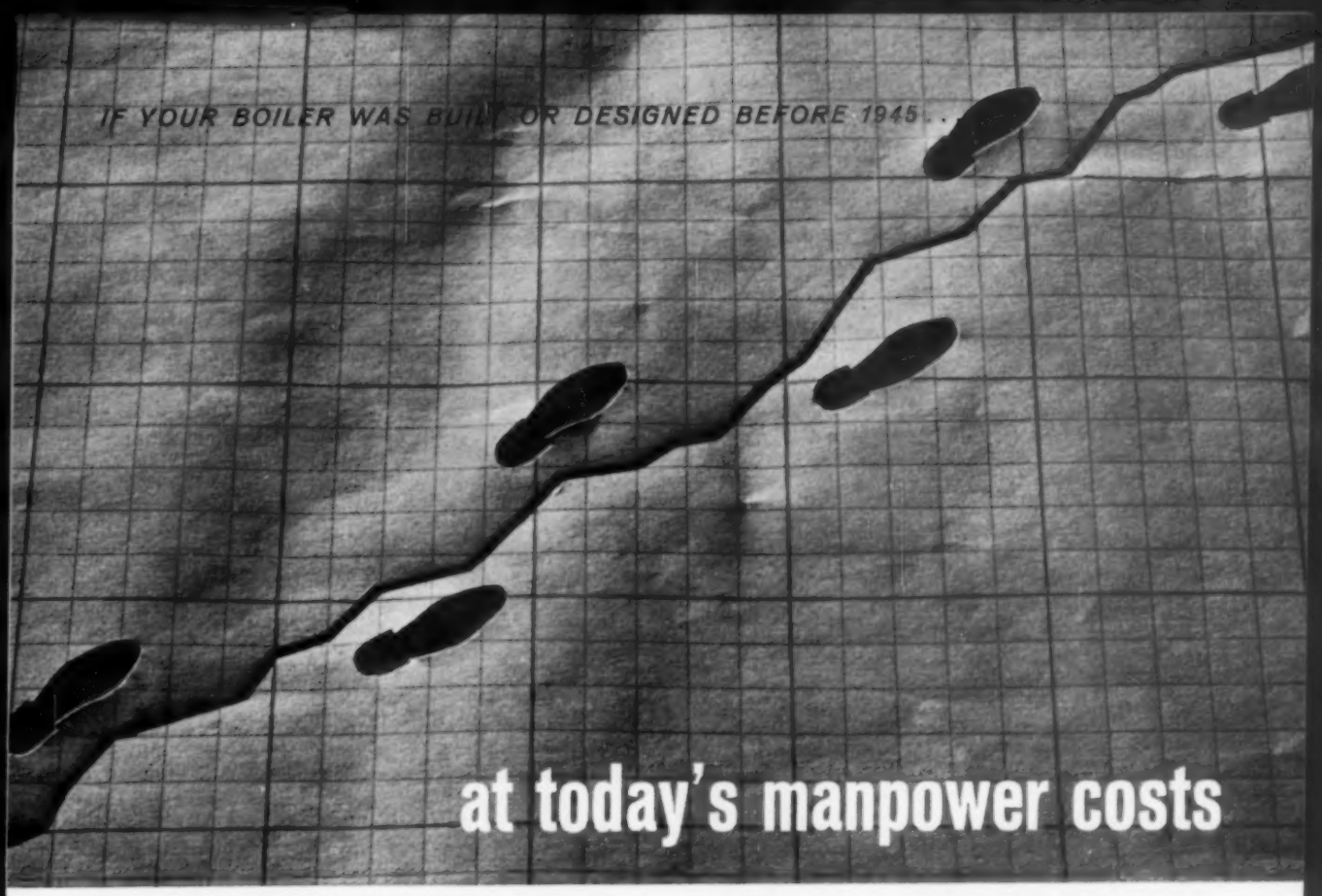
Secondly, he pointed out that neither political party "has a corner on understanding the profit system or has a secret weapon for getting economic growth in this country." But amidst all the newness in Washington, industry should direct government's attention to its problems and one of these is the taxing policy, particularly the inadequate allowance for depreciation.

A recent report shows that $95 billion worth of our industrial machinery is out-dated now, and $60 billion worth more will grow obsolete by 1970 unless the present inadequate depreciation provisions of the tax laws are changed. That would total $155 billion worth of obsolete facilities which cannot be replaced out of depreciation allowances and will therefore constitute a drain upon profits.

But the total reinvested profit of all corporations in 1959 was only $10.5 billion, and at that rate would mount to only $105 billion over the next ten years. So if we merely keep on going as we are we would still be $50 billion short of meeting our replacement needs, even if all of this reinvested profit could be used for the modernization of facilities — which, of course, it could not be.

Moreover, this does not make any provision for the probability that we are going to have to provide tools for 13.5 million new workers in the next 10 years — and at an average of at least $20 thousand for each worker, that means a further capital investment of $270 billion.

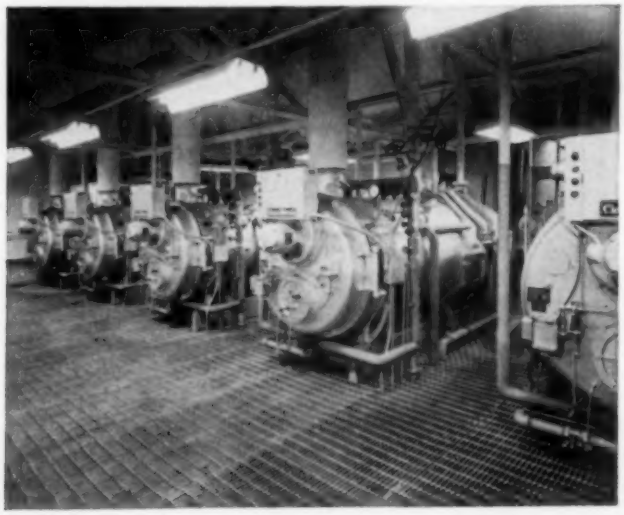
And finally, that businessmen should make an all-out effort to bring the true story of the need for and the benefits from profits to the public so that this misunderstanding which exists in some areas will be overcome.



you may be paying for it a second time!

$15,000-A-YEAR LABOR SAVINGS

Diebold, Inc., Canton, Ohio, century-old manufacturer of bank protection and office equipment, replaced old, coal-fired boilers with new, fully automatic, gas-fired CB boilers and saved $15,000 to $18,000 in annual manpower cost. *All five of these new boilers are operated by just one man* — other personnel have been transferred to more productive work assignments. Bill Roby, assistant plant engineer, speaks highly of the ease of installation and the compact design.



New or old, there's one thing about any boiler that's up-to-date: you have to pay today's wages for the men who tend it. This becomes out-of-line overhead if you're operating a boiler designed in the days when man-hours were far less costly.

As wages have doubled during the past two decades, one manufacturer, Cleaver-Brooks, has pioneered in making a boiler that requires fewer man-hours to operate. Today's CB packaged boilers provide a combination of labor-saving design features and performance standards that cannot be found in any other boiler — at any price.

Hinged doors, front and rear, provide for quick cleaning of the tubes. It takes only 40 seconds to remove and replace the retractable burner nozzle. Fully automatic, these boilers include electronic safety devices which release the operator for other duties. And, because some jobs require quick changeover from one fuel to another, Cleaver-Brooks boilers are designed to make this change in less than a minute.

All this is provided by Cleaver-Brooks in the most compact, fuel-saving packaged unit on the market. Sizes through 600 hp . . . oil, gas and combination oil-gas firing . . . larger sizes in Cleaver-Brooks Springfield water-tube boilers. All models completely pre-engineered and tested as a package . . . expertly started for you by a trained field engineer.

Your local Cleaver-Brooks agent can supply more details. Ask him, or write for the booklet, *How to Select a Boiler.*

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ORIGINATOR AND LARGEST PRODUCER OF PACKAGED BOILERS

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Dept. C-305 E. Keefe Ave., Milwaukee 12, Wisconsin

TIMELY COMMENTS

Reliability Factors in Steel Usage

Abstracted from a speech delivered at the Annual Electric Steel Conference by THOMAS N. HALLOWELL, President, Standard Pressed Steel Co.

IN THIS ATOMIC AGE there is a growing need for better steel. I would like to begin by telling you that there are about 50 million grains in one cubic inch of steel which has a grain size of number 5. Each of these individual grains has a composition of atoms. It has boundaries and is in a certain relation to its neighboring grains.

While a small iron whisker has a tensile strength of 2 million psi, just why are we so inefficient that common steel has about 100,000 psi tensile — 5% of the potential of pure iron. When we take into account the factor of safety of say 5, we get a design value of 20,000 psi or about 1% of the 2 million pounds.

By this time there has been enough experience with present types of steel and their uses under our every day conditions that they are fairly dependable, especially when we use a very small percentage of the total inherent properties of the steel. In other words, we've learned to play it safe!

But times have changed and the steel hasn't — at least not very much! We no longer can afford to use the great weight or mass and the excessive size that goes with great mass. One hundred years ago the solution was to make the section heavier and use more material and whatever space was needed. Costs were low, labor cheap, speeds slow and competition was quite leisurely.

Today, with the cold war, extremely high costs of everything — especially labor — unbelievably keen world-wide competition and with speeds getting up to those required for space travel, we're forced to do a complete about-face in our ideas on the use of mass and volume.

We're rapidly being forced to use to a greater proportion the potential properties of metals. Weaknesses are now appearing because we've changed the rules of the game. What used to be acceptable in performance simply won't do the job of today. In other words, we demand a degree of reliability that is sufficiently high so that our assemblies will do the job required.

If we have 100 components in our assembly, and each component comes from a lot that is 99% O.K. (1 out of 100 defective) then we only get 36% good assemblies. Change the component reliability to 98% instead of 99% and only 13% of the assemblies will work — 96% decreases the assembly performance to 1.6%.

Or go the other way — if 410 parts of an assembly each come from lots that are 99.44/100% reliable, only one out of 10 of the resulting asemblies will satisfactorily perform.

The intuitive recognition of these built-in uncertainties in any cubic inch of steel is the reason we've been using such a low figure for dependable steel strength in our engineering circles. It's also the reason the steel industry has developed a high degree of persuasion in its average steel salesman — so that a lot of steel which develops a problem can be made to stay in the customer's plant. And it also partially explains the reason most metallurgists use double talk.

The time has come when we, as customers using more than 75,000 tons per year of all types of alloy steel, carbon steel, tool steel and specialty steels, want each cubic inch to be within the specifications in every detail. The reason for this simple request is that the parts we make from the steel have to do a tougher job than ever before.

In order to cope with this new way of life we have become extremely suspicious and critical of any lot of steel. Each lot of incoming material is checked in great detail.

We can't live with seams, cracks, pits, porosity, pipes, inclusions, variable grain size, poor annealing, decarb, woody structure, high hydrogen content, poor susceptibility to plating.

We keep complete, detailed inspection and performance records of every lot of steel received. Our new orders go only to those mills who according to these records are supplying satisfactory steel.

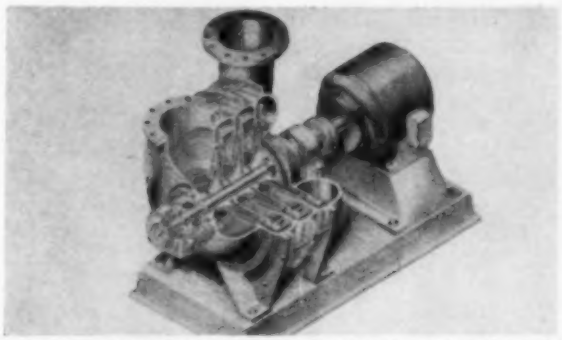
When the variables in a lot of steel are held to a close degree of spread we can greatly increase the performance of the parts made from this lot.

I encourage you to give some thought to the steel you make and realize that one way or another it must be better tomorrow than it is today. Highly reliable steel is the only kind we can afford to buy because that's the only kind we can live with.

U. S. HOFFMAN MACHINERY CORP.

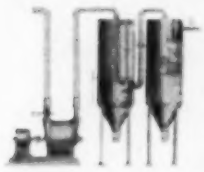
AIR APPLIANCE DIVISION — 103 Fourth Ave., New York 3, N. Y.

Designers and manufacturers of multistage centrifugal air and gas blowers/exhausters—portable and stationary industrial vacuum cleaning systems — pneumatic conveying equipment — dust collectors — Smooth-Flow tubing and fittings — continuous metal, rubber and plastic strip/sheet dryers — steam and gas operated air heaters — valves and accessories.



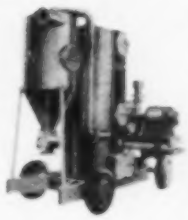
MULTISTAGE CENTRIFUGAL BLOWERS & EXHAUSTERS

Rugged cast iron Hoffman blowers deliver clean dry air or gas in continuous duty applications such as combustion, agitation, drying, vacuum cleaning, sewage and waste treatment, pneumatic conveying, air squeegee, ore flotation, circulation of liquids, asphalt blowing, etc. Pressures to 10 psig, vacuums to 12" hg, and volumes to 20,000 cfm. Outboard mounted bearings. One piece cast aluminum impellers. Dynamically balanced rotors. No internal wearing parts. Vibration free operation. Constant pressure or vacuum throughout capacity range. Suitable for direct drive by motor, turbine or engine. Common steel baseplate.



STATIONARY VACUUM CLEANING SYSTEMS

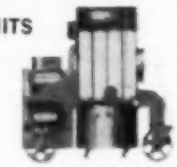
Permanently installed stationary vacuum systems ranging from 3 hp to 100 hp permit cleaning operations throughout the plant with collection at a central location. These systems will help prevent product contamination, insure better housekeeping, salvage valuable materials, eliminate manual handling and disposal. Heavy duty dust separators receive material and large filter cloth areas insure thorough separation. Suction hoses are inserted into strategically located inlet valves in piping system.



PNEUMATIC CONVEYING EQUIPMENT

Hoffco-Veyor pneumatic systems keep dry, powdery and granular materials on the flow. Permanent installations transfer a variety of materials including chemical powders, starch, plastic pellets, pharmaceuticals, etc., from one point to another in the production process. Rugged portable Hoffco-Veyors such as this trailer mounted unit, can be used to handle catalyst, clay, sand, etc., in refineries, brick plants and chemical installations.

PORTABLE VACUUM CLEANING UNITS



Maximum efficiency in industrial housekeeping can be achieved with Hoffman heavy duty portable vacuum cleaners which range from 1½ hp through 15 hp. Mobility and flexibility enables the operator to do an efficient and thorough job of vacuum cleaning anywhere in the plant. Typical of the Hoffman portable units is the 7½ hp Hoffco-Vac 75 developing 7.8" hg suction and capable of operating two hose lines simultaneously. Filtering area 48 sq. ft. Removable dust bucket with capacity of 7.5 cu. ft.

MATERIAL INTAKE VALVE

Unique feeding valves permit the introduction of dry free flowing materials into vacuum conveying systems. Design incorporates offset air and material entry ports making it possible to regulate material flow and yet allow air to enter the line for purging. Separate air inlet protects connected equipment from full suction of the system. Constructed of cast iron, stainless steel or bronze. Valves can be modified for air cylinder operation.

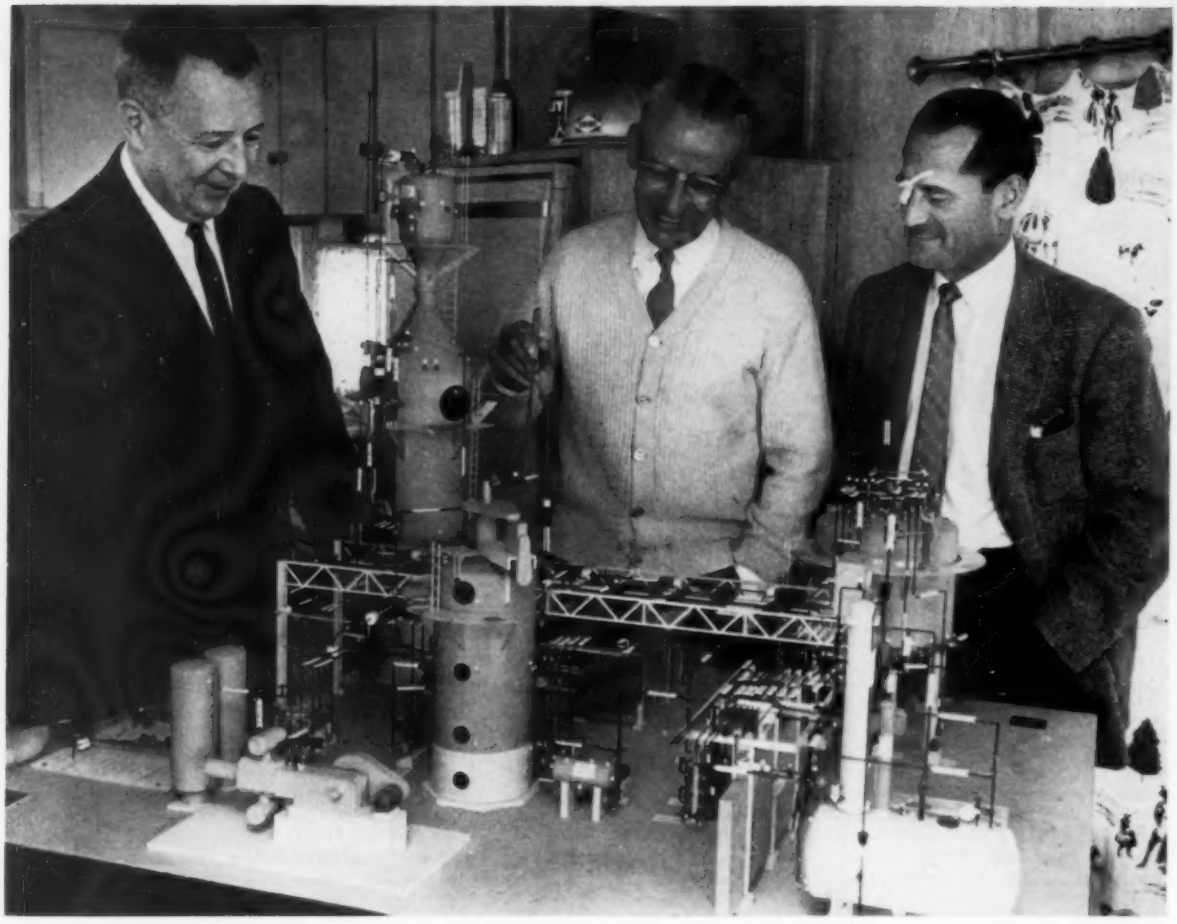
PERISTALTIC VALVE

Rubber diaphragm valve utilizes peristaltic action to discharge materials in controlled quantities. Designed to handle the type of product which can not be successfully passed through a rotary feeder, Alternate opening and closing of sheet rubber diaphragms facilitate passage of coarse abrasives or odd shaped materials. Elliptical body section and sandwiching of diaphragms insures positive closure against high differential pressures. Fail-safe feature provided in event of rupture of either diaphragm.

ROTARY DISCHARGE VALVE

These chain-driven air-locks of cast semi-steel construction discharge materials from pneumatic systems. Valves have torque limiting drive sprockets to protect against jamming and overloading. Equalizing connections permit attachment of bleed lines to vacuum or pressure source. Inspection of interior can be made through access port without disassembling valve. Fabricated and cast multi-bladed rotors are designed for interchangeability. Standard horizontal shaft gear motors.

Write for illustrated catalogues. Our application engineers are available for a survey of your production and maintenance problems without obligation.



A model of the plant on Weedon Island being discussed by A. P. Perez, engineering vice-president of Florida Power Corporation; Allen Campbell, job superintendent; and Paul Quenin, project engineer for Blaw-Knox. This Florida island may be an historic site if the Cornell process wins out in the frantic race to solve the saline water conversion problem.

Engineers Look Forward to Results from Florida Pilot Plant

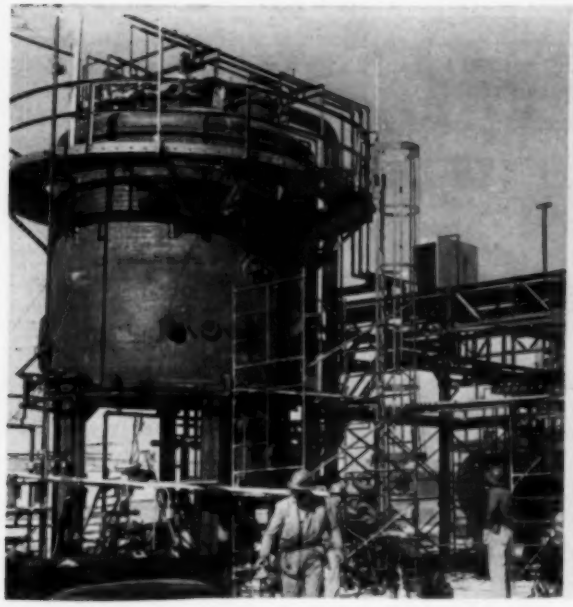
Salt Water Conversion Process

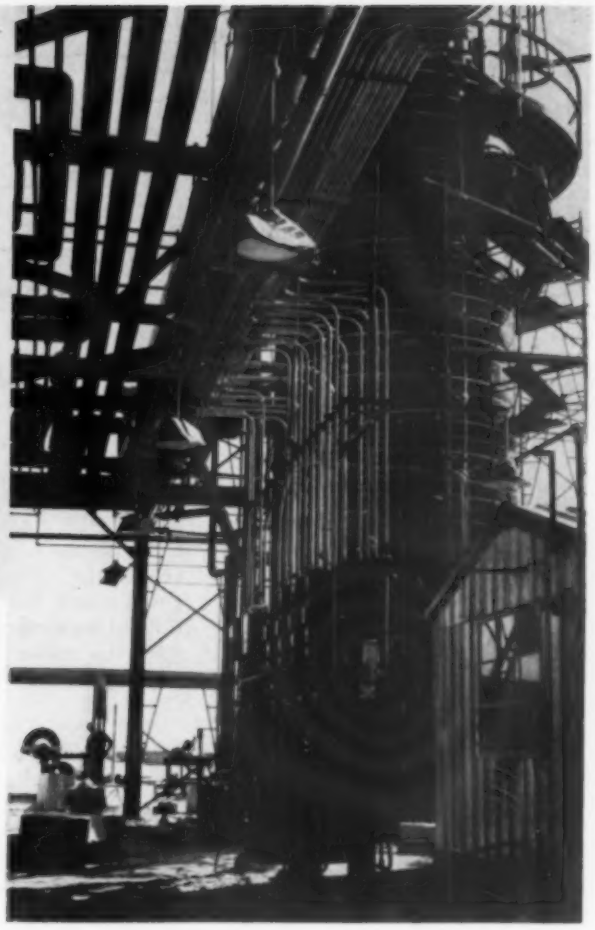
By HARRY J. MILLER

RESEARCHERS with Resources for the Future, Inc., in Washington, D. C., estimate that it will cost taxpayers somewhere between $54 and $74 billion to meet the country's water needs in 1980. Consequently, the age-old struggle to turn salt water into fresh water is receiving increased engineering interest. A pilot plant rapidly nearing completion on Weedon Island, on the fringe coastline of St. Petersburg in lower Tampa Bay is an important link in the chain of experiments that should lead to success.

Expected to produce a daily output of 35,000 gallons, the $500,000 plant is the target of inquiries from around the world. According to Project Engineer Paul Quenin: "The British government, for instance, is holding off building some plants in the Near East until it sees how we do."

The Weedon Island project is the nation's only saline water conversion pilot plant using the Cornell freezing process and will go into operation that will continue for a period of three to six months until the temperature approach needed has been determined.





Two different processing units shown (above and right) are incorporated in one pilot plant at Weedon Island. Position of these elements in the plant can be seen by close examination of the view of the model on opposite page.

This large pilot plant is a joint project of the U. S. Interior Department's office of saline water; Blaw-Knox Company; Cooper-Bessemer Corporation; and Florida Power Corporation.

Florida Power Corporation is contributing water and power at cost, in addition to a site adjacent to its Bartow generating plant. The project engineer said that the government is paying about three-quarters of the cost, with Blaw-Knox making up most of the balance. St. Petersburg was chosen as the site last April.

Mr. Quenin and Mr. Allen Campbell, job superintendent, feel they are involved in a race in which $500,000 is a small item.

"This pilot plant," says Mr. Quenin," is only to prove we can produce water at a cost of 50 cents per 1,000 gallons.

"There are places in the United States today where $2 per 1,000 gallons is a practical price. There was a town in California where they were paying $5 per 1,000 gallons until they installed a distillation unit.

Breakthrough

"A major breakthrough this past year has been this freezing process. It has reduced the target price from $1 to 50 cents per 1,000 gallons. Your major expense is the first cost-construction. After that, the plant has very low maintenance and operation cost."

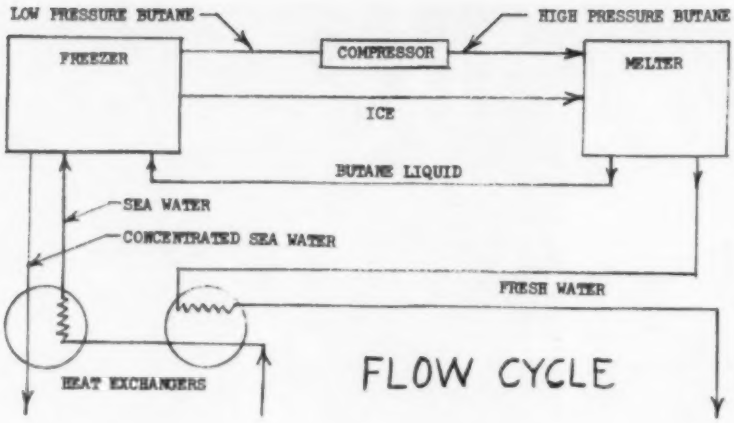
Two promising freeze processes are competing for the Department of the Interior's nod as the method to be used in the fifth government-sponsored plant for saline water conversion. One is the Weedon Island operation, a development of Cornell University's Professor H. F. Wiegandt and the Blaw-Knox Company, in which butane refrigerant is vaporized in direct contact with salt water. The other is Carrier Corporation's pilot plant at Syracuse, New York, which carries the freezing process to almost zero temperatures, well below the Blaw-Knox system.

From the two pilot plant tests will come final decision resulting in a freeze-process demonstration plant (probably on the East Coast), rounding out the five government-sponsored plants now being developed — each using a different method of operation.

While the Weedon plant envisions the use of butane, a $1,246,-250 plant at Freeport, Texas, will utilize the long tube-vertical multiple effect distillation process employing a 12-effect evaporator unit, and will use a new technique for avoiding scale formation by use of a suspension of fine solids in the brine.

Weedon Island Process

"In the case of the Cornell process at Weedon Island," says Mr. Quenin: "salt water mixed with



butane is pumped into the *rotocel*, a rotating basket device. The saline feed is chilled by heat exchange with fresh water and rejected brine, then partially frozen. By freezing about half the water the impurities are concentrated in the other half.

"This freezing step produces overhead vapor which is removed and processed, and a slurry of ice in brine. The slurry goes into a washing device where brine is drained off and the ice crystals washed free of adhering salt water, then the ice is conveyed to the melter unit.

"Here the crystals are melted by introducing butane vapor at slightly higher pressure. The potable water is sent to storage tanks, while the brine is dumped back into the bay.

"For every two pounds of sea water, we will obtain one pound of fresh water," says the project engineer.

Mr. Campbell, job superintendent, points out that "It takes only 144 Btu to change one pound of water to ice, but 970 Btu to evaporate a pound of water. Thus, freezing has a potential advantage over other processes since it takes power and energy to produce the Btu.

"A plant using a freeze process must handle a solid phase; lose control of your temperature a bit and you have to shut down to thaw out. For this reason, the Weedon operation includes agitators to constantly keep the slurry loose."

Cost comparisons will be difficult, Mr. Quenin admits, because the operation is small, and actually the Weedon project embraces a pair of pilot plants under test. One is the Blaw-Knox system described above; the other, Professor Wiegandt's unit which combines the Rotocel freezing-washing operation with the melter tank process, all in one unit resembling a Cape Canaveral rocket.

With about four men required to operate the finished plant, Mr. Quenin says the freezing process based upon application of direct contact refrigeration was first used by Japanese scientists three years ago. Then Dr. Wiegandt applied it to reclaiming water.

Needs and Prospects

If the Weedon Island plant and its process turn out to be the practical, low cost "fresh water from salt" method so eagerly sought, "it can be a very great political aid," says Mr. Quenin. "The water shortage in the United States is not as critical as it is in the countries of the Near East. We can give them the solution to a great many of their problems if we can give them water to develop their lands."

St. Petersburg has its water woes; the city is even now pushing a second pipe line to the Cosme-Odessa wells at the head of Tampa Bay. Is there a saline water conversion plant in its future?

"Eventually, yes," says Mr. Quenin, "when you consider the industry coming into this area and the population growth." He said such a plant would not be practical at the moment. St. Petersburg's city water plant superintendent, Harry Oberly, commented that the city's present charge is 25 cents per 1,000 gallons. For the fiscal year ending September, St. Petersburg's consumption was 6,136,360,000 gallons.

However, keenly eyeing the Weedon project is Key West which gets its water through a $6 million, 129-mile long pipe line from wells at Florida City. Key West residents pay $1.25 per 1,000 gallons and would welcome the prospect of 50-cent water.

By 1975, estimates are that our population will reach 225 million. These citizens will need 530 billion gallons of water a day. Last year Congress appropriated more than a billion dollars for water resource development for the second consecutive year.

This is more than the total Uncle Sam spent during the first 135 years of our nation's existence.

Industrial Needs

Every year, as rain and snow, ten million gallons of water fall to earth for every American. Most of it runs off to sea or is evaporated to perpetuate the water cycle from raindrop to the land, thence to the sea and back again to the clouds. The United States uses more water than it does all other materials combined; an average of 1,200 gallons for each person each day. This amounts to almost 2,000 tons of water per year for every person, as compared to only 18 tons of all other materials, including food.

While it is true that much of the water used by industries flows back to its source after being used for cleaning, cooling and other industrial processes, the fact remains that it takes 70,000 gallons of water in process to make a single ton of paper. A West Virginia company requires a pumping capacity of 265 million gallons daily and a Gary steel mill needs double that amount. In the 17 western states alone, irrigation accounts for more than two-thirds of the total water consumption. These examples make it obvious that America has no single water problem. Rather, it has a host of separate problems on the city, county and state levels.

It is no surprise then that the Weedon Island plant's completion is being awaited with the keenest interest by scientists, engineers and economists.

Louisiana Cement Plant Improves Operation By Better Vision

Closed Circuit TV Removes Guesswork

VISUAL communications through closed circuit television have taken the guesswork out of operating two of the most modern cement kilns in the world. Both 400-footers at Lone Star Cement Corporation's plant at Lake Charles, Louisiana, are equipped with closed circuit cameras, peering through windows into the kiln coolers.

The cameras are installed in fixed positions against the windows and tilted to coincide with the slope of the cooler grates. Wide-angle lenses give the units ample scanning range to view the entire cooling process.

And what they see is flashed simultaneously on a monitor at the master control panel — two floors above and hundreds of feet away. This continuous "live" monitoring gives the operator immediate, first-hand knowledge of just what is happening in the cooler.

Cement-making process starts when raw slurry is fed into the back of the cylindrical kiln. The material is burned in temperatures starting at 600 F and, as the slurry moves forward, increasing to a maximum 2,800 F at the burner in the front of the kiln.

The process changes the slurry into Portland cement clinkers, which fall from the kiln into a grate-type cooler under the kiln room floor. Here the closed circuit TV system goes to work.

Specifically, it detects any build-up of clinker chunks that could choke up the cooler entrance. It discovers threatened overloading of the grate. It warns the operator of overheating.

Better Operation

The immediacy and accuracy of this information contribute significantly to the most efficient and economical operation of the huge kilns.

Because the monitor is at the master control panel and because it presents a "live" image, the operator can take corrective action before the build-up of clinkers chokes up the cooler entrance. Similarly, he can regulate the flow to prevent overloading of the grate. And when overheating becomes a threat, he can furnish additional cold air under the grate immediately. The cameras can actually pick up details in the cooler that would escape the human eye.

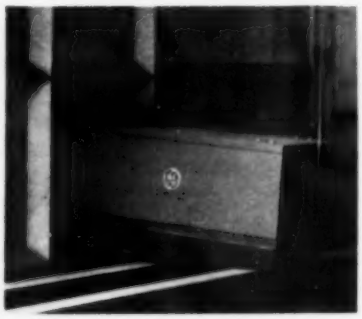
Formerly, if a gauge in the master control panel indicated trouble in the operation, the operator often was forced to guess its nature or else stop the kiln to investigate. At other times, he descended two flights of stairs to look through the cooler window.

Some conditions can cause the cooler's pressure gauges to indicate trouble that doesn't exist. As a result, the operator often had to slow or stop the kiln to adjust problems that weren't there.

It is the elimination of this uncertainty that gives closed circuit its major value, because when a kiln is stopped, it begins immediately to cool. This causes a costly loss of time and productivity. The two Intra-Tel cameras supplied by General Electric are Type TE-6-B industrial TV models.

The TV camera (below) is enclosed in a weatherproof housing and monitors the cooler.

The viewing screen at top right adajcent to master control panel displays "live" picture of what is happening in kiln cooler.



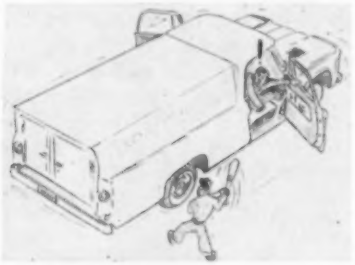
Centrifugal Pump Clinic

QUESTIONS and ANSWERS
Conducted for SPI Readers

By IGOR J. KARASSIK
Consulting Engineer and
Manager of Planning
Harrison Division
Worthington Corporation

QUESTION . . . . . .

ATTACHED PLEASE find a sketch which shows a typical installation of Vertical Turbine Pumps. There seems to be a difference in opinions among pump manufacturers as to whether or not the down thrust should be considered as a factor in foundation loading in addition to the static weight of the pump and motor combined. I will appreciate your opinion and comment on the subject matter. (J. A. L.)



ANSWER . . . . . .

I AM NOT AWARE that such a difference of opinions exists among pump manufacturers. But if such a difference does exist, it is based on a lack of understanding of certain basic laws of mechanics. Questions on the subject do arise frequently, however, and I think that it deserves being given a very thorough "airing."

But first, I have to admit that for some perverse reason this problem keeps reminding me of an anecdote that falls into the category of the shaggy dog story. Some of the readers may have heard it before, but I was tempted to relate it here:

A young student, hitch-hiking home from his university, flagged down a small truck which stopped in front of him. The driver motioned him to get in, at the same time swinging open the door on his own side. He grabbed a baseball bat from below his seat, jumped down, ran to the back of the truck and beat violently on the truck panels for a full ten seconds. He then ran back to his seat, slammed his door closed and determinedly started the truck up the road.

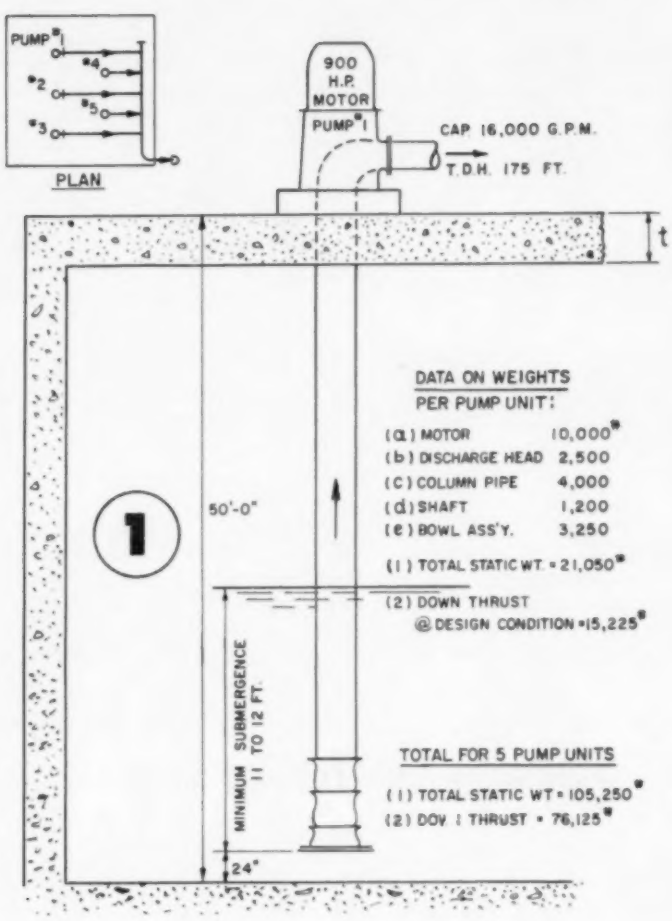
The young hitch-hiker was somewhat astonished by the peculiar sequence of these events, but kept his peace for the moment. Five minutes later, the truck rolled to an abrupt stop on the side of the road, the driver again jumped down, grabbed his baseball bat and proceeded to the rear, repeating his furious banging on the truck panels. He then again ran back to get behind the steering wheel and drove on.

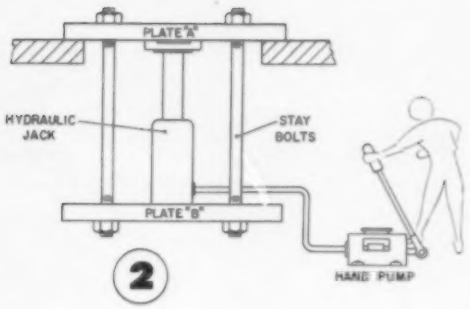
The hitch-hiker was beginning to be more than puzzled — he started to worry over the possibility that he had accepted a ride from a maniac. When the whole crazy procedure was repeated once more after another five minutes, he hesitatingly asked the truck driver what all this meant. "Oh! replied the driver, it's very simple. You see, this is a one-half ton truck and I have 1,500 pounds of chickens back there. If I don't keep one-third of them flying all the time, we'll be in real trouble."

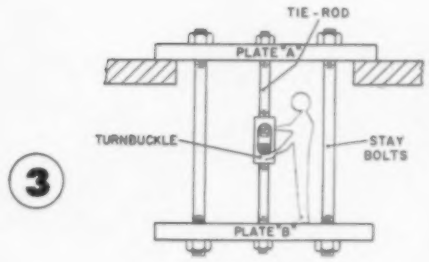
Actually, the problem of the suspended vertical pump is quite simple when it is thought through logically. A single suction impeller, such as is used in vertical turbine pumps, is generally unbalanced as to axial hydraulic forces and exerts an axial thrust downward. The magnitude of this thrust varies with the pressure developed by the impeller and with the unbalanced area of the impeller. The total downward thrust, transmitted to the shaft of the pump is, of course, the summation of the axial thrusts of the individual impellers comprising this pump.

This thrust acts in combination with the static weight of the pump rotor and of the motor rotor. It must be counteracted by a thrust bearing — generally located within the motor. But, a pump and motor mounted as you show it in your sketch (Fig. 1) form a self-contained entity and all internal forces and stresses must be balanced within this entity. The foundations will react strictly to the static weight of the pump and of its motor, plus the weight of the water contained in the pump.

Bear in mind that the weight of this water is far from being negligible. If we assume that the column pipe of the unit you are dealing with is 24" in diameter, the approximately 50 feet of pump will contain close to 10,000 lb of water. This weight must be added to the 21,050 lb weight of pump and mo-







tor combined when calculating the load on the foundation.

In order to better illustrate the conclusion that the axial thrust is not a load on the foundation, we can develop our reasoning by analogy. The effect can be likened to the structure illustrated in Fig. 2. A flat plate "A" is resting on foundations over an opening. A second plate "B," is attached to it by stay-bolts. A hydraulic jack is mounted on plate "B" and is connected to a pump by means of a hose.

The load on the foundations is equal to the dead weight of plates "A" and "B," of the stay-bolts and of the hydraulic jack. If the pump is operated and the hydraulic jack starts to push plates "A" and "B" apart, the stay-bolts will be subjected to an increased tensile stress. The various stresses, however, will be entirely contained within the system made up of plates "A" and "B," of the stay-bolts and of the hydraulic jack. The load on the foundations supporting plate "A" will not be affected in the slightest.

Another arrangement may consist of the same two plates and staybolts and of a tie-rod attached to the two plates and joined in the center by a turnbuckle. A man stands on the lower plate, as indicated on Fig. 3. The load on the foundations is equal to the weight of the plates, the man, the stay-bolts and the tie-rod. If the man tightens up on the turnbuckle, shortening the tie-rod, the stay-bolts will be compressed and the two plates will tend to come closer together, but the load on the foundations will not change by a single ounce: our suspended system is self-contained.

On the other hand, if the pump and the motor are supported separately and are joined strictly by means of a rigid coupling which connects the pump and motor shafts (See Fig. 4) our situation will have changed radically. No longer is our system self-contained. Since the pump and motor shafts are rigidly connected, the motor thrust bearing must still counteract a downward thrust equal to the sum of the weights of the pump and motor rotors and of the axial thrust developed by the pump. But the load on the foundations when the pump is operating is no longer the same as when the unit is idle.

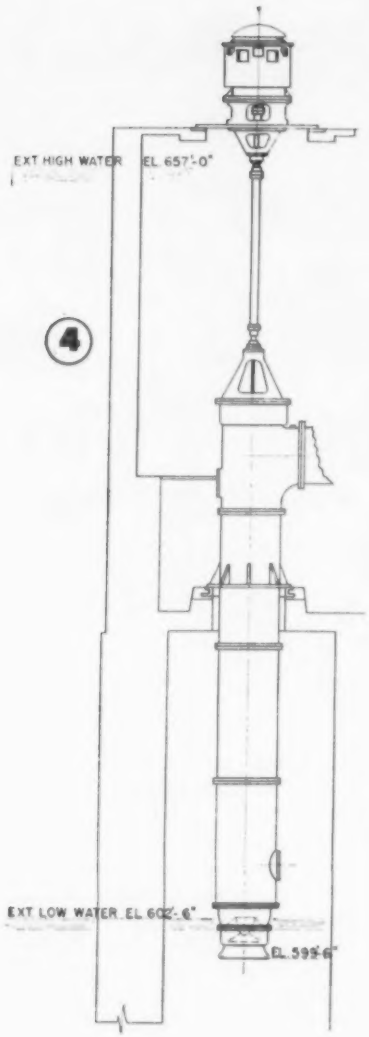
Let us return to our two plates, our tie-rod and the man standing on the lower plate, but let us eliminate the stay-bolts which connected the two plates in Figs. 2 and 3. Let us, instead, support the lower plate on one foundation and the upper plate on another, as on Fig. 5. If our man tightens the turnbuckle to shorten up the tie-rod, the lower plate will tend to pull up on the lower foundation (reducing the load on that foundation) while the upper plate will pull down on the upper foundation (increasing the loading there).

And so it is with a pump and motor, *supported separately* as on Fig. 4. The respective foundation loads will be:

A. WHEN IDLE:

1. On the foundation supporting the motor: The weight of the motor plus the weight of the pump rotor.

2. On the foundation supporting the pump: The weight of the pump



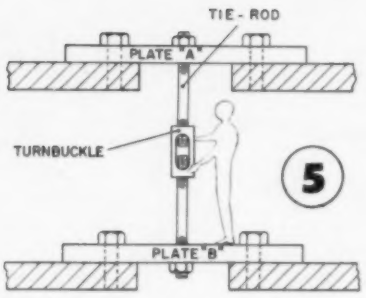
stationary parts, plus the weight of any water contained in the pump above the level of the water surrounding the pump.

B. WITH UNIT RUNNING:

1. On the foundation supporting the motor: The weight of the motor plus the weight of the pump rotor, *plus the axial hydraulic thrust developed by the pump.*

2. On the foundation supporting the pump: The weight of the pump stationary parts, plus the weight of the water in the pump, *less the axial hydraulic thrust developed by the pump.*

Note that in order to simplify this explanation I have neglected to mention certain other forces which act on a structure such as a vertical turbine pump suspended from foundations. One of these is



the force caused by the acceleration of the column of water at the moment of start-up. The reaction to this accelerating force is in the form of a torque and is not transferred to the foundation. This additional required torque must, however, be considered in the calculations of start-up conditions, because the time required to come up to full speed depends on the difference between the available torque from the motor and the total torque required by the pump.

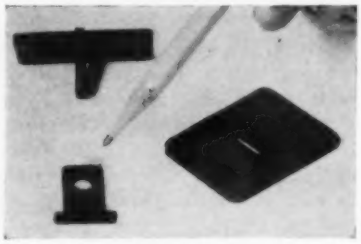
Another force is that caused by the change in the direction of flow at the discharge head elbow. This reaction tends to reduce slightly the vertical load on the foundation but introduces some reaction in the horizontal direction. Finally, there may be some transient reactions on the foundation if water-hammer occurs in the installation, caused by too rapid closure of valves.

Actually, these various forces are not of major significance in calculating the foundations. Some designers make it a practice to add an empirical 15% to the pump, motor and water weights to cover the contingency of these forces. In my opinion this added 15% is optional and not absolutely necessary, since any foundation design will normally include an ample factor of safety over the calculated loads imposed by weight alone.

Stamping Cut Tooling Cost

TOOLING can add up to a substantial part of the overall costs for producing insulation parts. Such costs can sometimes be cut considerably, if parts can be produced by stamping or punching from sheet material rather than by molding them, says Taylor Fibre Co.

These savings are possible, the company points out, if the design can be broken down into flat pieces which can be assembled to perform the same function as a one-piece molded part.



It is true that extra assembly operations are then required. But the lower cost of dies for stamping and punching may more than offset the extra assembly costs, particularly on short runs.

Taylor cites an application of vulcanized fibre at Walker Electrical Company, Atlanta, Ga., a subsidiary of I-T-E Circuit Breaker Co., as a case in point.

Walker recently found a neat solution to a tricky design problem in the production of small blank space barriers used to insulate between bus stabs (branch circuit connecting straps) of opposite polarity on electrical panelboards.

Punching this blank space barrier from vulcanized fibre sheet produced by Taylor Fibre Co., rather than by molding, dropped tooling costs from estimated $1,500 (single-cavity mold) to $300 (punching dies).

The blank space barrier is now assembled from two stamped pieces as illustrated. Piece in foreground is force-fitted through the slot in the second piece (at right) producing a rigid, high-strength assembly as shown at left and top. Ability to meet the design requirements by assembling flat pieces not only cuts tooling costs but also permits the round screw hole shown, as against a slot needed when molding.

COLLECTORS

CLEANERS

FILTERS

STRAINERS

AIR & GAS CLEANING

FANS & BLOWERS

MATERIALS & SUPPLIES

CONTROLS

RECOVERY SYSTEMS

. . . . . Air and Gas

CATALOGS AND BULLETINS . . . . .

Reference literature available from manufacturers to help solve air cleaning problems and apply materials and equipment.

Use Reader Service Card on Page 81

O-1—Electrical Precipitation — Bulletin AI-101, 8 pages, outlines basic steps and deals with charging, precipitating and discharging dust particles. — AEROTEC INDUSTRIES, INC.

O-2—Purifiers — Series of Bulletins, bound, catalog purifying equipment for steam, vapor, gas, air. — CENTRIFIX CORPORATION.

O-3 — Spray Booths — Catalog I-7000-B, 36 pages, shows water wash, paint arrestor, and dry baffle types in actual plant use; selection data; diagrams. — THE DeVILBISS COMPANY.

O-4—Pneumatic Conveyors — Bulletin, 20 pages, illustrates and describes suction systems, pressure systems, and other equipment and services offered. — THE BRADY CONVEYORS CORPORATION.

O-5—Fans—Bulletin A-108, 16 pages, presents fan engineering data; pictures propeller-type fans, blowers, roof ventilators and unit heaters. — HARTZELL PROPELLER FAN CO.

O-6—Heating & Ventilating — Bulletin 567, 18 pages, covers components, operation, dimensions and other pertinent facts on heating and ventilating units.—THE NEW YORK BLOWER COMPANY.

O-7—Giant Size Fans — Form 465, 4 pages, introduces intake or exhaust fans available in sizes from 84" to 108", electrically reversible and featuring extra heavy duty belt drive. — AMERICAN COOLAIR CORPORATION.

O-8 — Gas Scrubbers — Bulletin AI-102, is complete with dimensions, capacity charts and formulas for selection of required sizes of units for centrifugal method of dry scrubbing for natural gas. — AEROTEC INDUSTRIES, INC.

O-9—Dust Arresters — Bulletin No. 164-5, 4 pages, includes photographs, diagram, and table of dimensions and capacities of automatic bag-type dust arrestors. — THE NORTHERN BLOWER COMPANY.

O-10—Electronic Air Cleaners—Bulletin E-77 explains how a type of electronic air cleaner operates similar to a magnet, for high efficiency cleaning and handling a wide variety of particles. — TRION, INC.

O-11—Ash Handling — Econo-Ash Folder, 4 pages, diagrams and explains system designed for economical ash handling in the small coal burning plant. — THE ALLEN-SHERMAN-HOFF CO.

O-12—Breeze Conditioning Systems — Form 349, 8 pages, defines "breeze conditioning," and outlines principles, typical industrial applications, and other factors. — AMERICAN COOLAIR CORPORATION.

O-13 — Reverse-Air Jet — Form 2131-M 83, 8 pages, offers solution to dust filtering problems through the new Model K Aeroturn dust filter, featuring improved blow rings.—KOPPERS COMPANY, INC., Metal Products Division.

O-14—"Precipitron" — Catalog 1415, 8 pages, covers the PX Precipitron electronic air cleaner with moving nozzle washer and other special features. Expains operation and tells how it saves money. Chart shows capacities and dimensions, and typical unit arrangement. — WESTINGHOUSE ELECTRIC CORPORATION.

O-15—Multi-Purpose Fans — Bulletin No. I-585, 16 pages, consists of selection data and other pertinent information on Type G fans to be used as blowers or exhausters for collecting or conveying dust, waste,

Cleaning.....

Reference Guide and Buyer's Directory for the South-Southwest

fumes, fines and lightweight granular materials. — THE DAY COMPANY.

O-16—"Ashveyor" — Bulletin, 22 pages, presents photographs, diagrams, and text explaining system operated by steam venturi jet exhauster or electric driven exhauster for plants having a great tonnage of ash, fly ash and soot.—THE BRADY CONVEYORS CORPORATION.

O-17—Silicon Rectifier — Bulletin 110, 4 pages, describes conversion unit for electric precipitators already in operation, designed to give more efficient power utilization with no operating maintenance. — BUELL ENGINEERING COMPANY, INC.

O-18—Air Handling Equipment — Bulletin G560, 16 pages, catalogs advanced processing equipment, including air handling and air pollution control systems. — EDW. RENNEBURG & SONS CO.

O-19—Air Filters — Bulletin F-320-5, 4 pages, shows design and assembly of unit type air filters with photographs and diagrams accompanied by explanatory text. — COPPUS ENGINEERING CORP.

O-20 — "Refrigifilters" — Bulletin F-100, 4 pages, tells how to get microclean, dehydrated, oil-free compressed air by installation of Refrigifilter system on compressed air line. —HANKISON CORP.

O-21—"Dycon" Filters — Bulletin No. 850, 4 pages, presents line of factory assembled filters including roll type, automatic oil bath, extended surface, panel, and grease filters. — CONTINENTAL AIR FILTERS INC.

O-22—Flooded Disc Scrubber — Bulletin 110, 4 pages, tells how it works, describes adjustable feature, and advantages for complete range of operating conditions. Charts show dimensions and performance data.— RESEARCH-COTTRELL, INC.

O-23—Vacuum Cleaner — Bulletin 191, 4 pages, offers a portable vacum with filter designed for safe handling of radioactive and toxic dusts in industrial plants. Photographs show equipment, components, and accessories. — CAMBRIDGE FILTER CORPORATION.

O-24—"Roll-O-Matic" —Bulletin No. 248-E, 16 pages, covers the improved Model B automatic renewable-media air filter in horizontal and vertical designs. — AMERICAN AIR FILTER COMPANY, INC.

O-25 — Dust Collection — Bulletin 471-2, 8 pages, contains engineering data on Mikro-Pulsaire collector units and related equipment. Lists specifications for basic standard requirements. — PULVERIZING MACHINERY, a Division of American-Marietta Company.

O-26 — Cast Iron Fans — Catalog 1130-1, 18 pages, charts performance and dimensions of Series 500 improved cast iron industrial fans. Illustrates equipment and components, and gives details of design and operation. — WESTINGHOUSE ELECTRIC CORPORATION, Sturtevant Division.

O-27—Air Purification—Catalog No. a661, 12 pages, includes plant photographs and description of industrial equipment for dust and fume control in processing plants. — THE R. C. MAHON COMPANY.

O-28—Dust & Fume Control — Condensed Catalog 372-D, 8 pages, features models designed to maintain maximum efficiency under all conditions, by means of air cleaner employing cloth filter tubes. — WHEELABRATOR CORPORATION.

O-29—"Uni-Wash" — Tech. Bulletin No. 1301-A, 12 pages, discusses models of Uni-Wash dust collectors for a variety of industrial applications. — DeVILBISS METAL FABRICATORS COMPANY.

O-30—Collection & Recovery—Buell-Norblo Bulletin, 4 pages, summarizes features of electric precipitators, mechanical and bag collectors, classifiers, fans, and combination systems for dust collection and recovery. — BUELL ENGINEERING COMPANY, INC.

O-31 — Clean Air — Bulletin No. 121A, 4 pages, emphasizes importance of selecting high-efficiency filtration equipment to prevent dirt penetration. Gives data on line offered. — CAMBRIDGE FILTER CORPORATION.

O-32—Activated Carbon — Bulletin 108A, 12 pages, catalogs equipment for air purification with activated carbon to purge odorous, gaseous, vaporous impurities. — CONNOR ENGINEERING CORPORATION.

O-33—Collector & Fractionator — Leaflet, 2 pages, describes power-driven unit which separates particles down to .1 micron, operates wet or dry at temperatures to 800 F, and handles wide range of materials. — MAJAC, INCORPORATED.

Reference Guide and Buyer's Directory for the South-Southwest

O-34—Control Systems — Brochure, 16 pages, presents data and illustrations covering dust control systems, air conveying systems, and systems for the removal of noxious fumes or excess heat. — YOUNG & BERTKE CO.

O-35—Compressor & Engine Filters —Bulletin 310-6, 4 pages, contains information on air filters for compressors and engines, designed to eliminate costs and delays of forced shut-downs caused by dust concentration. — COPPUS ENGINEERING CORP.

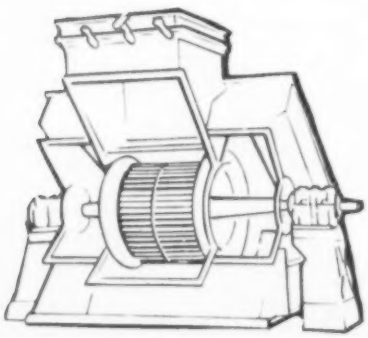
O-36—Fly Ash Removal — Bulletin P57A, 4 pages, describes each of the types of pneumatic ash and fly ash systems offered, with diagrams showing arrangement. — NATIONAL CONVEYORS COMPANY INC.

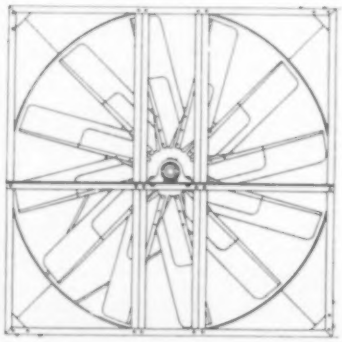
O-37—Cloth Bag Collector—Bulletin 914, 8 pages, explains by photographs, diagrams, and captions the principle of operation for Type CM cloth bag dust collector, and lists outstanding features. —PANGBORN CORPORATION.

O-38 — Air Pollution — Bulletin 31d/Mi, 12 pages, offers solution to air pollution problem by means of electronic air cleaners and charcoal filters, designed to reduce operating costs and improve plant efficiency. — MINNEAPOLIS-HONEYWELL REGULATOR CO.

O-39 — Gas Line Filter — Leaflet 772-101, 2 pages, tells how to prevent clogged pilots with the Series CGN125 consumer gas line filter. Lists specifications. — AIR-MAZE DIVISION, Rockwell-Standard Corporation.

O-40—Fume Scrubbers — Bulletin B-71, 4 pages, is composed of case histories with plant photographs showing fume scrubbers for chemical-corrosive air pollution abatement. — HEIL PROCESS EQUIPMENT CORPORATION.





O-41—Automatic Dust Collector — Form No. FM60, 4 pages, tabulates specifications and engineering data on equipment which brings automation to dust control. —TORIT MANUFACTURING COMPANY.

O-42 — Air Handling Apparatus — Folder, 4 pages, illustrates high-efficiency dust collecting, ventilating and conveying systems and outlines engineering services. — THE STERLING BLOWER COMPANY.

O-43—Industrial Vacuum — Bulletin No. 155B, 12 pages, catalogs stationary and portable equipment for industrial vacuum cleaning, with applicational photographs. — THE SPENCER TURBINE COMPANY.

O-44—"Mist-O-Miser Dustraxtor" — Bulletin WC-101, 6 pages, lists features of dust collection equipment, principle of operation, capacities, and applications. — FLY ASH ARRESTOR CORP.

O-45—Airfoil Fans — Bulletin No. 179, 8 pages, charts specific speed curves of airfoil fans, and shows how to make a selection for individual requirements. — THE GREEN FUEL ECONOMIZER CO., INC.

O-46—Pneumatic Ash Handling — Ashvac Data Sheet Z1, 4 pages, gives schematic arrangement of steam jet pneumatic ash handling system for the small boiler plant, and includes pertinent engineering data. — THE ALLEN-SHERMAN-HOFFF CO.

O-47—Fans for Industry — Bulletin RF 589-1, 14 pages, is composed of Sections A through E, covering RF industrial fans designed for heavy duty service in ventilating and light material handling aplications. — GARDEN CITY FAN COMPANY.

O-48—"Condensifilters" — Bulletin 4158, 4 pages, presents a single compact unit combining a dehydrator, a separator, a mechanical filter, and an optional internal trap, for instrument-quality compressed air. — HANKISON CORPORATION.

O-49—Exhausting Corrosive Fumes— Bulletin 702-A shows how corrosive fumes can be exhausted by the use of rubber, lead lined, or specially coated fans. —CLARAGE FAN COMPANY.

O-50—Regenerative Fly Ash Collector—Folder, 6 pages, describes new design to remove fly ash, soot, and cinders from flue gas by centrifugal separation. — BRESLOVE SEPARATOR COMPANY.

O-51—Cyclones — Bulletin A-9159 covers cyclones, wash collectors, filters, and valves for control of dust and purification of air and gases. — THE DUCON COMPANY, INC.

O-52—Air Moving — Bulletin DB 45 gives case studies and engineering details for air moving and air cleaning equipment in industrial plants and related applications. — DeBOTHEZAT FANS DIVISION, American Machine & Metals, Inc.

O-53—"Dynaclone" Filters — Bulletin 104 outlines economies of effective dust control through salvage of materials, maintenance of clean plants, and reduction of wear and nuisances. Describes various types of Dynaclone filters. — THE W. W. SLY MFG. CO.

O-54—Cube Type Filter—Tech. Bulletin covers 12 sizes of new Ulox cube type air filter with Dynel medium for industrial air conditioning, heating and ventilating systems. — UNION CARBIDE DEVELOPMENT CORP.

O-55 — Air Handlers — Technical Bulletins describe air handling units available in 665 to 47,000 cfm capacities. — ACME INDUSTRIES, INC.

O-56—Activated Charcoal — Technical Bulletin explains use of activated charcoal for high percentage air recirculation and odor control in air and liquid purification and separation-recovery systems.—BARNEBEY-CHENEY COMPANY.

O-57—"Chem-Jet" Systems — Bulletins describe Chem-Jet systems to control dust at source; scrubbers for removing dust, fumes and odors; and Verticone for dust-free unloading of bulk materials. — JOHNSON-MARCH CORPORATION.

O-58 — Airfoil Centrifugal Fans — Bulletin No. FD-11, 4 pages, lists standard and optional features, illustrates equipment, and shows standard drive arrangements.—FLY ASH ARRESTOR CORPORATION.

O-59—Dust Control Equipment — Bulletin No. 271, 12 pages, features dry centrifugals, wet collectors, fabric collectors, and electrostatic precipitators. — AMERICAN AIR FILTER COMPANY, INC.

O-60—Pneumatic Regulators — Bulletin H-2, 8 pages, gives performance data and characteristics of Series H regulators for pressure, vacuum, differential, ratio, and reversal air filtration. — CONOFLOW CORPORATION.

O-61 — "Flutter-Jet" — AIA File 30-D-3, 4 pages, describes washing system that cuts air cleaner maintenance problems with surging water power. — MINNEAPOLIS-HONEYWELL REGULATOR COMPANY.

O-62—"Dustube" Collectors — Bulletin No. 562-D, 24 pages, shows photographs of specific plant applications of equipment for efficient dust and fume control. — WHEELABRATOR CORPORATION.

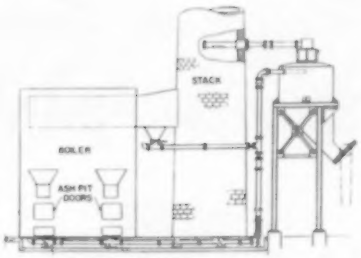
O-63—"Cycloidal" Exhausters—Bulletin HS-576 covers compact units to efficiently handle grinding dust, buffing particles, and any of the lighter materials suitable to pass through a fan. — GARDEN CITY FAN COMPANY.

O-64—"Aerodyne" Dust Collector — Bulletin No. 171, 8 pages, tabulates typical applications and describes equipment for industrial dust collection, with photographs and line drawings. — THE GREEN FUEL ECONOMIZER CO., INC.

O-65 — "Roll-Kleen" — Bulletin B-1400-8, 8 pages, introduces the V-7 air filter with media that winds on spools to present clean filter media when required, employing same roll-up principle as film in a box camera. — FARR COMPANY.

O-66—Clean Separation — Bulletin 21, 4 pages, tells how clean separation between liquid and vapor is accomplished with Yorkmesh Demisters (mist eliminators — entrainment separators). — OTTO H. YORK COMPANY, INC.

O-67—Reverse Jet Dust Filter — Bulletin F-75, 24 pages, is a comprehensive brochure giving facts on design, application and benefits of the "AC" dust filter, with charts, drawings, and plant photographs. — THE DAY COMPANY.



O-68—Oil Mist Precipitator — Catalog E-50, 4 pages, explains purpose, principle of operation, construction features, and application of oil mist precipitators — TRION, INC.

O-69—"Mikro-Pulsaire" — Bulletin 52A-1, 10 pages, presents data on improved jet action collector designed with no moving parts — internally or in the primary gas stream — for maximum recovery of dusts. — PULVERIZING MACHINERY, a Division of American-Marietta Company.

O-70 — Collectors & Separators — Folder, 6 pages, illustrates and describes self contained cabinet cloth-filter type dust collectors, and high efficiency centrifugal cyclone separators. — TORIT MANUFACTURING COMPANY.

O-71—"Airways" — Catalog No. 180, 20 pages, covers line of portable ventilators and cooling fans, with diagrams, cutaway sections, and installational photographs. — COPPUS ENGINEERING CORPORATION.

O-72—"Dustfoe" Space Filter —Bulletin No. 1505-6, 8 pages, includes performance data, construction details, uses, and ordering information for units designed to remove finely divided particulate matter from air and gas streams — MINE SAFETY APPLIANCES CO.

O-73 — Air Processing — Bulletin S-5, 12 pages, outlines a broad service involving the application of air processing to the production requirements of many industries. — J. O. ROSS ENGINEERING, Division of Midland-Ross Corporation.

O-74—Industrial Ventilating Equipment — Bulletin 5/Ha, 8 pages, catalogs propeller fans, duct fans, vaneaxial blowers, roof ventilators, centrifugal blowers, and related equipment. — HARTZELL PROPELLER FAN CO.

Reference Guide and Directory for the South-Southwest

O-75—Corrosive Fume Removal — Bulletin D-7400, 6 pages, gives specifications and other engineering data on solid plastic centrifugal fans for corrosive fume control. — HEIL PROCESS EQUIPMENT CORPORATION.

O-76 — "Aeroturn" Filter — Form 1309-M85, 2 pages, is a data sheet on the Model F dust filter designed for efficient and economical collection of fibrous and linty materials. —KOPPERS COMPANY, INC., Metal Products Division.

O-77—Heavy Duty Fans — Bulletin "572, 20 pages, tabulates engineering data on Class II and Class III heavy duty industrial fans with IPL wheel; discusses construction, arrangement, and application.—THE NEW YORK BLOWER COMPANY.

O-78—Classifying Systems — Folder, 4 pages, introduces new high efficiency classifying systems for separation or dedusting of dry powdered materials. — BUELL ENGINEERING COMPANY, INC.

O-79 — Air Conditioning Units — Bulletin No. AC-100, 60 pages, presents an entirely new line of Kennard Nelson packaged central station air conditioning units with "built-in" better air. — AMERICAN AIR FILTER COMPANY, INC.

O-80—Wet Dust Control — Bulletin No. 920, 8 pages, illustrates and describes the Ventrijet for wet collection of industrial dusts. — PANGBORN CORPORATION.

O-81—Industrial Dust Control —Catalog G 100, 16 pages, includes electrical precipitators; mechanical collectors; combination units; filters, scrubbers, processors and heaters. — WESTERN PRECIPITATION DIVISION of Joy Manufacturing Co.

O-82—"Whirlex" Dust Collectors — Bulletin SC-15, 4 pages, covers the MTSA 9CYT multiple cyclone dust collectors designed for higher efficiency, maximum gas capacity, and minimum draft loss.—THE FLY ASH ARRESTOR CORPORATION.

O-83—"RG" Type Fans — Bulletin No. 180, 8 pages, diagrams centrifugal fan arrangements, gives speed curves, and tells how to make selection of the RG fan, which features special blade design. — THE GREEN FUEL ECONOMIZER CO., INC.

O-84—Self-Washing Filter — Bulletin B-1000-3, 8 pages, features the Far-Air self-washing filter, which automatically washes and automatically reoils, and is applicable to a wide range of industries. — FARR COMPANY.

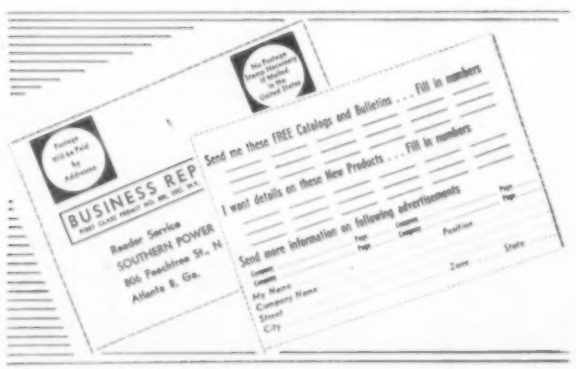
O-85—Centrifugal Separator — Bulletin E-596, 12 pages, describes the HV heavy duty, high efficiency, centrifugal dust separator. Includes photographs, charts, and diagrams.—THE DAY COMPANY.

O-86—Bag Type Collectors — Bulletin No. 163-5, 4 pages, tells about Norblo standard bag type dust collectors and electrical shaker mechanism for bag cleaning. — THE NORTHERN BLOWER COMPANY.

O-87—Dust Control for Industry — Bulletin No. 922, 16 pages, discusses dust control and equipment, and presents case histories.—PANGBORN CORPORATION.

O-88—Centrifugal Blowers — Catalog ACB-104, 8 pages, covers Multistage centrifugal air and gas blowers and exhausters, custom engineered to plant needs for clean, dry air or gas at constant pressure.—U. S. HOFFMAN MACHINERY CORP.

O-89—Dust & Fly Ash Collectors — Bulletins describe Series 342 ("cyclone" principle, with individual tubes which permit flexibility in design to fit plant layout) and Series 361 (primary and secondary systems for high efficiency fly ash recovery). —AMERICAN-STANDARD INDUSTRIAL DIV.



FREE READER SERVICE

A full-size reader service card is provided for your convenience on page 81. USE IT to order catalogs listed in this section and for other services offered.

The directory on following pages lists air and gas cleaning equipment representatives that serve your area.

USE IT to help find the man you want to help you keep your equipment operating safely and efficiently.

Buyer's Directory

This tabulation lists many of the important air and gas cleaning equipment manufacturers and their representatives in the South and Southwest. Some manufacturers, however, failed to furnish information requested.

ACME INDUSTRIES INC., 600 Mechanics St., Jackson, Michigan.

Florida, Jacksonville 7: Hugh White, P. O. Box 5711

Florida, Miami 35: J. F. Spears, J. F. Spears Company, 2001 S.W. First St.

Florida, Pensacola: R. A. Sansing, Sansing Sales Engineers, 620-A West Barrancas

Georgia, Atlanta 24: B. Stromquist, Stromquist & Co., P. O. Box 13316

Kansas, Wichita: George Foulds, 303 Pattie Ave.

Kentucky, Louisville 2: Olan J. Hill, Olan J. Hill Co., 316 Tyler Bldg.

Maryland, Baltimore 18: G. Robert Reese, J. E. Perkins Corp., 2131 Maryland Ave.

Missouri, Kansas City 8: S. C. McCann, S. C. McCann Company, 2600 Oak St.

Oklahoma, Oklahoma City: C. P. Lindsey, Engineered Mech. Equipment Co., 811 N. Virginia

Tennessee, Memphis: James G. Coleman, 2399 Parkway Place

Texas, Corpus Christi: Phil Price, P. O. Box 3224

Texas, Houston 6: James F. Calvin, Acme Industries, Inc., 2706 Richmond Ave.

Texas, Lubbock: Bob Carow, P. O. Box 3206

Virginia, Norfolk: R. L. Traviers, Breeden & Collier Co., 424 West 21st St.

Virginia, Richmond 26: E. Glenn Breeden, Breeden & Collier Co., P. O. Box 8752

AEROTEC INDUSTRIES, INC., Greenwich, Conn.

Florida, Jacksonville: T. C. Heyward & Co., 306 West Adams St. Phone ELgin 5-3521

Georgia, Decatur: A. J. Kroog Co., 235 E. Ponce de Leon Ave. Phone DRake 7-6711

Kansas, Mission: The Hesler Co., 203 Muntzel-Keach Bldg. Phone RAndolph 2-6464

Louisiana, New Orleans 22: Arthur C. Hayes & Assoc., 2217 Pelopidas St. Phone EVergreen 1486

Missouri, St. Louis 8: Economy Equipment Co., 4526 Olive St. Phone FOrest 7-5328

North Carolina, Charlotte 3: T. C. Heyward & Co., 518 E. Morehead St. Phone FRanklin 7-2678

Oklahoma, Tulsa 5: Vanco Engineering Co., 4407 South Peoria. Phone RIverside 7-0425

Texas, El Paso: Landes, Zachary & Peterson Co., 2137 Mills St. Phone KEystone 3-9060

Texas, Houston 5: C. C. Pryor Co., 2435 North Boulevard. Phone JAckson 2-7515

Virginia, Richmond 1: Frank Howell Co., 17 East Cary St. Phone MIlton 3-8427

AIR-MAZE DIVISION, Rockwell-Standard Corporation, 25000 Miles Road, Cleveland 28, Ohio.

Alabama, Birmingham 3: James D. Wright, Associated Engineers, 3716 3rd Ave. South. Phone LYric 2-8116

Alabama, Mobile: Jack Chichester, P. O. Box 6095. Phone GReenwood 9-7244

D. C., Washington 7: L. Stuart Mitchell, Allen, Mitchell & Co., 1053 31st St., N.W. Phone FEderal 3-1818

Florida, Jacksonville 3: H. L. McMurry & Co., 614 Fields St., P. O. Box 2548. Phone ELgin 5-8322

Florida, Miami 33: George Brophy Co., 3356 Virginia St., P. O. Box 33-291 Coconut Grove Sta. Phone HIghland 4-6253

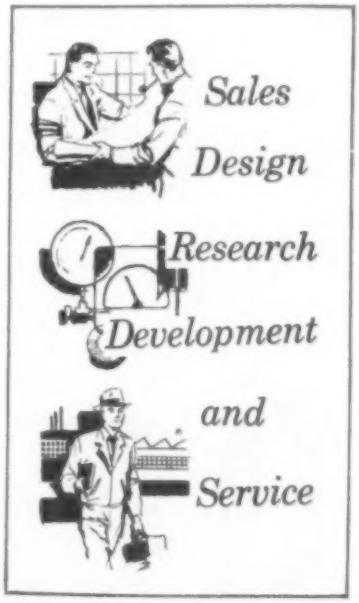
Florida, Orlando: Bob Lucas, H. L. McMurry & Co., P. O. Box 7216. Phone MID 7-1155

Florida, Tampa: Ralph Hyer, H. L. McMurry & Co., 114 S. 12th St. Phone 2-8495

Georgia, Atlanta 3: Felix J. Commagere, Commagere Associates, 157 Simpson St., N.W. Phone JAckson 5-2761

Kentucky, Louisville 2: Evan Ames, Richard Equipment Co., 633 S. 5th St. Phone JUniper 3-4646

Louisiana, New Orleans 12: C. R. Clingman, 1224 Richards Bldg. Phone MA 6316



Reference Guide and Buyer's Directory for the South-Southwest

Louisiana, Shreveport: J. W. Cherry Co., 151 Olive St., P. O. Box 4098. Phone 5-8738

Maryland, Baltimore 18: E. H. Taze, Taze & Hewitt, Inc., 33 E. 21st St. Phone BElmont 5-5895

Missouri, Kansas City 8: H. L. Jorban, Manufacturers' Sales Co., 1733 Locust St. Phone GR 1-5654

Missouri, St. Louis 30: C. W. Baker, 6953 Olive Street Road. Phone PArkview 5-2880

North Carolina, Charlotte 4: Howard V. Caton Co., 230 N. Torrence St. Phone FR 5-2028

Oklahoma, Tulsa 14: D. B. Hutchcraft Co., 2821 S. Florence Ave. Phone RIverside 2-1261

Tennessee, Memphis 12: J. E. Hurston, 2470 Poplar Ave. Phone GLendale 8-4462

Texas, Corpus Christi: T. N. Inglis, L. S. Pawkett & Co., P. O. Box 3476 Kleberg Sta. Phone TUlip 4-3166

Texas, Dallas: C. D. Collins, Welco Sales Inc., P. O. Box 35226 Airlawn Sta. Phone LAkeside 6-8651

Texas, Dallas 5: J. Holland, The Eads Co., 5523 Dyer St., P. O. Box 8204. Phone EMerson 3-3637

Texas, El Paso: G. H. Jackson, Herlin Engineering Co., 600 W. Paisano Drive, P. O. Box 512

Texas, Fort Worth 7: W. C. Richardson, Welco Sales Inc., 1109 Currie St., P. O. Box 9229. Phone EDison 2-7116

Texas, Houston 19: Ralph Eads, The Eads Co., 1115 Dunlavy, P. O. Box 13071. Phone JAckson 6-1646

Texas, Houston: J. K. Ramsey, Ramsey & Robinson, 1109 Rosine, P. O. Box 7585. Phone JAckson 3-7970

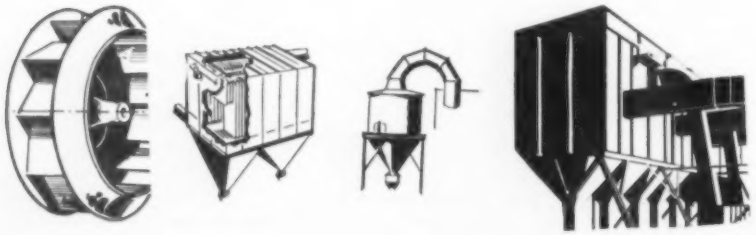
Texas, Lubbock: R. A. Mixon, Welco Sales Inc., 3138 34th St. Phone SHerwood 4-7358

Texas, San Antonio: L. S. Pawkett & Co., 1927 N. St. Marys Street, P. O. Box 8057, Laurel Hts. Sta. Phone CApitol 6-1291

Virginia, Norfolk 10: Laurence Trant & Co., 111 W. Main St. Phone MAdison 2-6914

Virginia, Richmond 19: J. C. Fullerton, Jr., Laurence Trant & Co., 601 E. Franklin St. Phone 7-4591

West Virginia, Charleston 1: Geo. S. Garrett Co., 1578 Lee St. Phone DIckens 6-2433



THE ALLEN - SHERMAN - HOFF COMPANY, 259 E. Lancaster Ave., Wynnewood, Pa.

Georgia, Atlanta 24: Boiler Equipment Service Co., 1079 Alco St., N.E., P. O. Box 13138. Phone ME 4-7373

Louisiana, New Orleans 24: Power Specialty Co., Inc., 5534 Canal Blvd. Phone HU 2-9575

Missouri, Kansas City 2: Hughes Machinery Co., 4212 Main St. Phone VA 1-7021

Missouri, St. Louis 17: Rhodes Equipment Co., 1401 S. Brentwood Blvd. Phone WO 2-8820

Texas, Houston 6: Power Specialty Co., Inc., 2000 Kipling St. Phone FE 7-1892

Virginia, Richmond 19: Williamson & Wilmer, Inc., 617 Mutual Bldg. Phone MI 3-9003

AMERICAN AIR FILTER COMPANY, INC., 215 Central Ave., Louisville 8, Kentucky.

Alabama, Birmingham 3: Harry G. Mouat Co., 544 American Life Bldg. Phone FA 2-3394

Florida, Clearwater: R. J. Clark Equipment Co., Inc., 1123 Seminole St. Phone 3-3783

Florida, Jacksonville 7: R. J. Clark Equipment Co., Inc., 1628 San Marco Blvd. Phone FL 9-7737

Florida, Miami 50: R. J. Clark Equipment Co., Inc., 7790 N.W. 7th Ave. Phone PL 1-4244

Florida, Orlando: R. J. Clark Equipment Co., Inc., 4401 E. Colonial Drive. Phone GA 5-6926

Georgia, Atlanta 9: AAF Company, Inc., 1430 W. Peachtree St., N.W. Phone TR 5-8006

Georgia, Atlanta 8: Badham Sales Co., Inc., 805 Peachtree St., N.E.

Kentucky, Louisville 2: AAF Company, Inc., Tyler Bldg., 319 W. Jefferson St. Phone JU 3-3371

Kentucky, Louisville 2: H. M. Lutes Assoc., 633 South 5th St. Phone JU 7-7349

Louisiana, New Orleans 25: Wm. H. Dudley, Jr., 340 Audubon Blvd. Phone UN 6-4747

Louisiana, New Orleans 22: Fred M. Erichson Co., 5705 St. Roch Ave. Phone 282-2555

Louisiana, Shreveport: Johnson-Jones Engineering Co., 311 Gladstone Blvd. Phone 7-2754

Louisiana, Shreveport: Lynn McGuffy Co., 304 Sklar Bldg. Phone 425-3466

Mississippi, Jackson: H. M. Ludlow Co., Inc., P. O. Box 1368. Phone 2-7689

North Carolina, Charlotte 1: Kirk Cousart & Assoc., 715 W. Morehead St. Phone FR 5-7737

North Carolina, Greensboro: Richard K. Hunter, P. O. Box 8357. Phone BR 2-0800

North Carolina, Greensboro: Kirk Cousart & Assoc., Waynick Bldg., 1822 Pembroke Road. Phone BR 5-8559

Oklahoma, Oklahoma City: O'Connor-Oklahoma Co., Inc., 3927 North Stiles. Phone JA 5-3561

Oklahoma, Tulsa 20: Dallas S. Deem, 1215 South St. Louis Ave. Phone LU 3-8716

South Carolina, Greenville: Kirk Cousart & Assoc., 209 E. Stone St. Phone CE 2-9513

Tennessee, Chattanooga 2: Robbins & Bohr, 814 Hamilton Nat'l Bank Bldg. Phone AM 7-6697

Tennessee, Knoxville 17: Ferguson Equipment Co., 1309 Broadway, N.E. Phone 4-1491

Tennessee, Knoxville 1: Charles F. Sexton, 702 Empire Bldg. Phone 3-9219

Tennessee, Memphis 17: C. W. Dean & Assoc., 4711 Poplar. Phone MU 2-1371

Tennessee, Nashville 4: Southern Sales Co., 1917 Division St. Phone AL 6-3223

Texas, Austin 5: Luedecke Engineering Co., 1007 West 34th St. Phone HO 5-7242

Texas, Dallas 4: The Ray Company, 4411 Belmont Ave. Phone TA 4-0177

Texas, El Paso: James-Cooke & Assoc., Inc., 2137 Mills St. Phone KE 2-8010

Texas, Houston 6: Mechanical Equipment Co., 4500 Montrose Blvd. Phone JA 9-4604

Texas, Lubbock: The Ray Co., 2109 Avenue Q. Phone PO 3-6216

Virginia, Richmond 19: AAF Company, Inc., 16½ North 9th St. Phone 644-2901

AMERICAN COOLAIR CORPORATION, 3604 Mayflower St., P. O. Box 2300, Jacksonville 3, Florida.

Alabama, Birmingham 1: Brownlee-Morrow Engineering Co., 745 N. 44th St. Phone LY 2-8143

Florida, Jacksonville 7: George Weeks & Associates, P. O. Box 5851. Phone EX-brook 8-7481

Florida, Miami: Hill Fan Company, 3397 N.W. 67th St. Phone OX 1-6001

Georgia, Atlanta 3: John L. Underwood Co., Inc., 555 Whitehall St., S.W. Phone MUrray 8-7878

Louisiana, New Orleans 22: Fred M. Erichson Co., 5705 St. Roch Ave. Phone FAirview 282-554

Louisiana, Shreveport: Johnson-Jones Engineering Co., P. O. Box 304. Phone 7-2754

Mississippi, Jackson: Gregory-Salisbury & Co., Inc., 350 N. Mart Plaza. Phone EM 2-1671

North Carolina, Charlotte: Howard V. Caton Co., 230 N. Torrence St. Phone FR 5-2028

Oklahoma, Oklahoma City 2: Federal Corporation, 120 E. Main St. Phone FOrest 5-7301

Tennessee, Memphis 4: Flinn Engineering Co., 123 N. Cleveland. Phone BR 4-1632

Texas, Dallas: A. Q. Roberts, 2608 Inwood Road. Phone FL 7-5811

Texas, Houston: W. L. Lashley & Associates, 1529 Haddon St. Phone JAckson 4-7401

Texas, Lubbock: The Houston Co., 2109 Ave. Q. Phone POrter 3-5212

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Kansas, Wichita 7: R. O. Rose, 211 Davidson Bldg.

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Louisiana, New Orleans 12: Walter Cooke, 305 Jahncke Bldg.

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Missouri, Kansas City 8: H. A. Burkart, 600 Davidson Bldg.

Missouri, St. Louis 1: C. T. Hastings, 1710 Railway Exchange Bldg.

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Oklahoma, Oklahoma City 2: R. L. Allsman, 519 Leonhard Bldg.

Oklahoma, Tulsa 3: H. S. Shafer, 421 Wright Bldg.

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Tennessee, Nashville 2: B. G. Kemp, 1719 West Bldg., P. O. Box 332

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Texas, Dallas 2: R. N. Goeth, 1213 Texas Bank Bldg.

Texas, Houston 2: T. W. Rawlings, 1909 Travis St.

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West Virginia, Charleston 23: P. E. Hansen, 1029 Virginia St., East

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Alabama, Birmingham: Bratton Sales Engineers, 2812 Twelfth Ave., N. Phone FAirfax 4-8534

Florida, Coral Gables 34: Joe Middleton & Co., 273 Alhambra Circle, P. O. Box 34-1219. Phone HIghland 4-6237

Florida, Miami 37: Florida Filters, Inc., 3110 N.E. Second Ave. Phone FRanklin 1-8625

Florida, Pensacola: Sansing Sales Engineers, 620-A W. Barrancas. Phone GL 5-4593

Georgia, Atlanta 5: Thermal Engineering Co., 314 Buckhead Ave., N.E., P. O. Box 12046. Phone CEdar 7-8664

Louisiana, New Orleans: David B. Fried, Jr., 6027 Chatham Drive. Phone 288-1052

Mississippi, Jackson 7: Air Filter Sales & Service Co., 449 Dory St., P. O Box 2445. Phone 2-7289

North Carolina, Raleigh: L. R. Gorrell Company, P. O. Box 5742. Phone TE 3-9090

Tennessee, Johnson City: O. M. Jones Company, P. O. Box 38. Phone 458

Tennessee, Memphis: R. H. Spangler & Co., Inc., 676 Marshall Ave. Phone JA 5-0246

Texas, Dallas 4: Harold O. Knape & Co., 2615 Routh St. Phone RIverside 7-7596

Texas, Houston 19: H. D. Grant Company, 1107 Rosine St. Phone JAckson 9-1777

Texas, San Antonio: Barnebey-Cheney Company, 4002 Broadway. Phone TAylor 6-8677

Texas, San Antonio: L. S. Pawkett & Company, P. O. Box 8057. Phone CApitol 6-1291

BRESLOVE SEPARATOR COMPANY, Commonwealth Bldg., Pittsburgh 22, Pa.

Maryland, Baltimore 1: Melvin J. Muhly, 712 Madison Ave. Phone VErnon 7-2269

Missouri, St. Louis: B&B Combustion Equipment Co., 4030 Chouteau Ave. Phone JEfferson 1-1039

Tennessee, Knoxville 16: Henry House, 1623 Melrose Place. Phone 2-3061

BUELL ENGINEERING COMPANY, INC., 123 William St., New York 38, N. Y.

Georgia, Atlanta: E. L. Shuff & Assoc., 2130 Maple Drive. Phone CEdar 7-0215

Missouri, Kansas City 12: Midwestern Power Eqpt. Co., 1214 W. 47th St. Phone VA 1-7407

Tennessee, Memphis 3: Engineered Plant Eqpt. Inc., 166 Monroe Ave. Phone JAckson 6-6232

Texas, Houston 2: Meyer F. Smith Co., 2314 South Main St. Phone JAckson 8-1131

CAMBRIDGE FILTER CORPORATION, 738 Erie Blvd., East. P. O. Box 1255, Syracuse 1, N. Y.

Alabama, Birmingham: Palmer & Lawrence, P. O. Box 1572. Phone FAirfax 3-1543

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Florida, Miami 35: J. F. Spears Company, 2001 S.W. First St. Phone FRanklin 3-0765

Florida, Pensacola: Manufacturers Sales Company, 1826 N. Pace Blvd. Phone YEllowstone 2-2224

Georgia, Atlanta 13: Crawley-Gorbandt Co., 118 W. Peachtree Place, N.E. Phone JA 3-6206

Maryland, Baltimore 11: Consolidated Supply Co., P. O. Box 4817. Phone HOpkins 7-6108

Missouri, Kansas City: D. M. Allen Co., 3021 Main St. Phone LOgan 1-9741

Missouri, St. Louis 10: R. R. Waites Company, 4233 Chouteau Ave. Phone JEfferson 5-4368

North Carolina, Charlotte 4: Howard V. Caton Company, 230 N. Torrence St. Phone FRanklin 5-2028

Oklahoma, Tulsa 3: R. E. Pauling, 201 Wright Bldg. Annex. Phone LU 5-9504

Tennessee, Johnson City: Lancaster Assoc., John Sevier Hotel Bldg. Phone WAlnut 6-0141

Tennessee, Memphis 4: Flinn Engineering Co., 123 North Cleveland. Phone BR 4-1632

Tennessee, Nashville: Vernon S. Tupper Co., 206 Tuck Bldg., P. O. Box 1103. Phone AL 4-6559

Texas, Dallas: J. R. Dowdell & Co., P. O. Box 10666. Phone FLeetwood 7-5631

Virginia, Richmond 19: Shultz & James, 9 East Cary St. Phone MIlton 4-3021

CENTRIFIX CORPORATION, 1017 LeHall, Houston 25, Texas.

Florida, Clearwater: Leroy E. Rogers Co., 9 North Highland Ave. Phone 36-8081

Georgia, Atlanta 1: Rittelmeyer & Co., Inc., 150 Nassau St. Phone JA 4-1531

Louisiana, Baton Rouge 5: Paul Condit Co., Inc., P. O. Box 52796. Phone EL 7-5511

Texas, El Paso: Engineered Equipment, P. O. Box 5282. Phone PR 2-1089

Texas, Houston 25: Paul Condit Co., Inc., 1025 LeHall. Phone JA 6-3027

Virginia, Arlington 1: Fluid Controls Co., Inc., 2521 Wilson Blvd. Phone JA 5-5352

Virginia, Richmond 19: Fluid Controls Co., Inc., 521 East Main St. Phone MI 3-7546

CLARAGE FAN COMPANY, One Clarage Place, Kalamazoo, Michigan.

Alabama, Birmingham 3: Harry G. Mouat Co., 544 American Life Bldg. Phone FAirfax 2-3394

Florida, Miami 34: Bob Lynn, 4301 S.W. 16th Street. Phone HIghland 3-0611

Georgia, Atlanta 8: Clarage Fan Company, 795 Peachtree St., N.E. Phone TR 6-4205

Louisiana, New Orleans: D. B. Fried, Jr., 6027 Chatham Drive. Phone EVergreen 1052

North Carolina, Charlotte: Howard V. Caton Co., 230 N. Torrence St. Phone FRanklin 5-2028

Tennessee, Knoxville 1: Tidewater Supply, 1506 Island Home Ave. Phone 2-0163

Tennessee, Memphis 12: J. E. Hurston, 2470 Poplar Ave. Phone GL 8-4461

Tennessee, Nashville 3: Wm. C. Armistead Co., 103 Sixteenth Ave. Phone CHapel 2-5006

Texas, Corpus Christi: L. S. Pawkett & Co., P. O. Box 3476. Phone 4-3166

Texas, Dallas: Allen Engineering Co., P. O. Box 1211. Phone ADams 9-1588

Texas, El Paso: G. M. Wallace & Co., 511 Electric Bldg. Phone KEystone 2-5439

Texas, Houston 4: Texas Engineering Co., 1309 Anita Ave. Phone JAckson 3-7431

West Virginia, Charleston 31: Mason & Barry, Inc., 603 Brooks St. Phone DIckens 4-4415

CONNOR ENGINEERING CORP., Shelter Rock Lane, Danbury, Conn.

Alabama, Birmingham: Brownlee-Morrow Engineering Co., 745 North 44th St. Phone LYric 2-8143

Florida, Jacksonville 7: A. L. Hospers, 1993 Largo Road. Phone FLanders 9-6433

Florida, Miami 69: Anthony C. D'Angelo, 841 N.W. 167th Terrace. Phone NAtional 4-5338

Florida, Tampa 9: Robert S. Belcher, 201 S. Woodlynne Ave.

Georgia, Atlanta 9: George Holden & Associates, Office E, The Darlington, 2025 Peachtree Road, N.E. Phone TRinity 3-3315

Louisiana, New Orleans 15: R. E. Newlin & Associates, 2307 Octavia St. Phone UN 6-6701

Louisiana, Shreveport: J. W. Cherry Co., Inc., 151 Olive. Phone 42-5-8738

North Carolina, Charlotte: Howard V. Caton Co., 230 N. Torrence St. Phone FRanklin 5-2028

North Carolina, Greensboro: R. K. Hunter & Co., 1404 Westridge Road. Phone BRoadway 2-0800

Tennessee, Chattanooga: Dwight L. McNulty, P. O. Box 1066. Phone 7-4125

Texas, Dallas: Marshall, Neil & Pauley, Inc., 2512 W. Mockingbird Lane. Phone FLeetwood 1-5347

Texas, Houston: Marshall, Neil & Pauley, Inc., 3513 W. Dallas Ave. Phone JAckson 9-3596

Texas, Lubbock: Bob Carow Company, P. O. Box 3206

Texas, San Antonio: R. S. Ryden Company, 109 Barrera St. Phone CApitol 6-7729

CONOFLOW CORPORATION, 2100 Arch St., Philadelphia 3, Pa.

Alabama, Birmingham 9: George S. Edwards Co., Inc., P. O. Box 5913. Phone TRemont 9-1633

Florida, Miami: K. L. Diller & Assoc., P. O. Box 2015, Pompano Beach. Phone WHitehall 1-2706

Georgia, Atlanta 18: The Procester Co., 2859 Ridgemore Road, N.W. Phone 799-6445

Louisiana, Baton Rouge: Williams Equipment Co., P. O. Box 14. Phone ELgin 5-4646

Louisiana, New Orleans: Williams Equipment Co., P. O. Box 35. Phone VErnon 5-9417

Louisiana, Shreveport: Hudson-Rush Co., 819 Kings Highway. Phone UNiversity 5-8441

Maryland, Baltimore 18: Jobe & Co., 2857 Greenmount Ave. Phone BElmont 5-3502

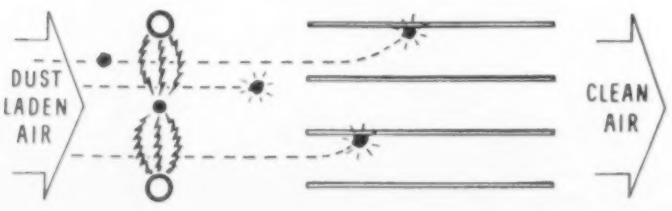
North Carolina, Charlotte 4: Brown & Morrison, P. O. Box 4297. Phone EDison 3-0774

Tennessee, Memphis 12: Engineered Instrument Sales Co., P. O. Box 9947. Phone FAirfax 3-1275

Tennessee, Nashville: Engineered Instrument Sales Co., P. O. Box 326, Madison. Phone COngress 2-1429

Texas, Dallas 18: Hudson-Rush Co., P. O. Box 18538. Phone DAvis 1-6471

Texas, Houston 5: R. Mack Goble Co., 2722 Sunset Blvd. Phone MOhawk 4-1922



Virginia, Richmond 19: Jobe & Co., 110 N. 8th St. Phone MIlton 8-1100

COPPUS ENGINEERING CORPORATION, 344 Park Ave., Worcester 10, Mass.

Alabama, Birmingham 9: Jos. W. Eshelman & Co., Inc., 1812 28th Ave. South, Homewood. Phone TRemont 9-3462

Georgia, Atlanta 5: Evans L. Shuff & Associates, Inc., 3120 Maple Drive, N.E. Phone CEdar 7-9215

Kentucky, Louisville 2: Allan K. Cook & Co., 604 W. Main St. Phone JUniper 7-1269

Louisiana, Metairie 5: J. H. Carter Co., Inc., 2551 Metairie Road. Phone VErnon 3-8281

North Carolina, Charlotte: Brown & Morrison, 1900 East 7th St., Phone EDison 3-0774

Oklahoma, Tulsa 3: Engineering Sales Co., 409 N. Cincinnati

Tennessee, Memphis 3: Engineered Plant Equipment, Inc., DuPont Bldg., 22 South 2nd St. Phone JAckson 6-6232

Texas, Fort Worth 7: Harris Pruitt & Co., 4025 West Rosedale. Phone PErshing 8-4992

Texas, Houston 27: Werlla & Company, 3402 Mercer. Phone JAckson 9-4787

Virginia, Richmond 19: W. H. Kidd & Co., 300 E. Main St. Phone MIlton 8-9240

CONTINENTAL AIR FILTERS, INC., P. O. Box 1647, Louisville 1, Kentucky.

Alabama, Birmingham: Bratton Sales Engineers, 2812 12th Ave. North. Phone FAirfax 4-8534

D. C., Washington 6: Irving M. Day Co., 723 Mills Bldg. Phone STerling 3-2982

Florida, Coral Gables 34: Joe Middleton & Co., 273 Alhambra Circle, P. O. Box 1219. Phone HIghland 4-6237

Florida, Gulf Breeze: P. H. Hutchinson & Assoc., 301 McClure Drive, P. O. Box 610. Phone YEllowstone 2-2717

Georgia, Atlanta 3: Barrow & Daugherty, 305 Techwood Drive, N.W. Phone JAckson 3-6036

Kansas, Mission: W. K. Dyer Co., 5420 Johnson Drive, P. O. 966. Phone HEdrick 2-2800

Louisiana, New Orleans 25: Frank A. Birdsong, 4528 S. Rocheblave, P. O. Box 13022. Phone UNiversity 6-9787

Maryland, Baltimore 8: Hamilton Easter, Inc., 605 Reisterstown Rd., P. O. Box 5820. Phone HUnter 6-7888

Missouri, St. Louis: Robert R. Waites Co., 4233 Chouteau. Phone JEfferson 5-4368

North Carolina, Charlotte: Hoffman & Hoffman, Inc., 509 Charlottetown Mall, P. O. Box 11356. Phone FRanklin 5-5960

North Carolina, Greensboro: Hoffman & Hoffman, Inc., 1102 East Wendover Ave., P. O. Box 6105. Phone BRoadway 4-0101

North Carolina, Raleigh: Hoffman & Hoffman, Inc., 510 St. Mary's Street, P. O. Box 10462. Phone TEmple 4-8522

Oklahoma, Oklahoma City: Heat Transfer Equipment Co., 613-A S.W. 4th St. Phone CEntral 5-2371

South Carolina, Columbia: Hoffman & Hoffman, Inc., 1639 Blanding St., P. O. Box 242. Phone AL 3-7666

South Carolina, Greenville: Hoffman & Hoffman, Inc., 1601 N. Pleasantburg Dr., P. O. Box 5201. Phone CEdar 3-5916

Tennessee, Memphis: James Coleman, P. O. Box 9951, Binghampton Station. Phone 7-9022

Texas, Dallas 19: Joiner-Meade-Capers, Inc., 3920 Cedar Springs. Phone LAkeside 6-8624

Texas, El Paso: Herlin Engineering Co., P. O. Box 512. Phone KE 3-4495

Texas, Fort Worth: Joiner-Meade-Capers, Inc., 2850-A West Berry St. Phone WAlnut 6-1291

Texas, Houston 19: McMillan Equipment Co., 1336 West Clay. Phone JAckson 2-5178

Virginia, Norfolk 10: J. A. Hagan, Jr. & Co., 820 West 21st St. Phone MAdison 2-2751

West Virginia, Charleston: The Pedley Equipment Co., 314 21st St. S.E., P. O. Box 4321. Phone DI 2-6920

THE DAY SALES COMPANY, 810 Third Ave. N.E., Minneapolis 13, Minn.

Florida, Lakeland: Process Equipment & Engrg. Co., 2440 Jonila Ave. Phone MUtual 6-5657

Georgia, Atlanta: C. E. Johnson, 412 Walton Bldg. Phone JA 2-2632

Missouri, Kansas City: The Day Sales Co., 6305 Brookside Plaza. Phone EMerson 1-0800

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Tennessee, Memphis: W. H. Gay, P. O. Box 3452. Phone MUtual 3-2822

Texas, Dallas: Tate & Roe Equipment Co., 5542 Dyer St. Phone EMerson 1-2859

Virginia, Roanoke: L. W. Finks, 362 Allison Ave. S.W. Phone DIamond 2-2123

DeBOTHEZAT FANS DIVISION, American Machine & Metals, Inc., East Moline, Ill.

Alabama, Birmingham: Bratton Sales Engineers, 2812 12th Ave. North. Phone FA 4-8534

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Georgia, Atlanta 3: Hairston & Co., 400 Five Ivy Bldg. Phone JAckson 4-0873

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THE DeVILBISS COMPANY, 300 Phillips Ave., Toledo 1, Ohio.

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Texas, Lubbock: J. R. Herring, 5404 29th St. Phone SWift 9-6726

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THE DUCON COMPANY, INC., 147 E. Second St., Mineola, N. Y.

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Louisiana, Baton Rouge: The Rawson Company, Inc., 4543 North Blvd., P. O. Box 2881. Phone DI 4-9407

Missouri, Kansas City 6: R. E. Bade, 1220 Commerce Bldg. Phone VI 2-5734

Missouri, St. Louis 77: H. C. Sharp Co., P. O. Box 7038. Phone FR 1-5355

Tennessee, Memphis 4: R. E. Overman Company, 2065 Union Ave. Phone BR 5-0844

Texas, Houston 19: Rawson-Houlihan Co., Inc., 1507 Haddon St., P. O. Box 13292. Phone JA 6-3836

DURABILT CONVEYING SYSTEMS Div. of Chicago Fire Brick Co., 1467 N. Elston Ave., Chicago 22, Ill.

North Carolina, Greensboro: P. O. Stribling, Jr., Box 2609

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Arkansas, Little Rock: T. J. O'Brien Eng. Co., 915 West 2nd St.

Florida, Miami: Ousley & Associates, 33 N.E. 6th St. Phone FR 1-7664

Georgia, Atlanta: Rittelmeyer & Co., 150 Nassau St. Phone JA 4-1531

Kentucky, Louisville 7: R. L. Craig Co., Inc., 195 Colony Way. Phone TWinbrook 6-6464

Louisiana, New Orleans: Engineering Sales Co., 171 Audubon Blvd. Phone UNiversity 6-2701

Missouri, Kansas City 8: Air Filter Sales & Service, 901 East 19th St. Phone VIctor 2-2850

Missouri, St. Louis 3: Ross Company, 3310 Olive St.

North Carolina, Greensboro: Chet Adams Company, 1052 Battleground Ave. Phone BRoadway 3-0566

Oklahoma, Oklahoma Cty: Eldon C. Thomas Co., 1000 S.W. Second. Phone CE 6-4541

Tennessee, Knoxville: Rogers & Morgan, 802 19th St. Phone 3-7942

Tennessee, Memphis 12: T. J. O'Brien Eng. Co., 169 Scott St. Phone FAirfax 4-3531

Tennessee, Nashville 3: Air Filter Sales & Service, 1529 Demonbreun St. Phone ALpine 6-3322

Texas, Dallas 35: Marshall, Neil & Pauley, 2512 W. Mockingbird Lane. Phone FLeetwood 1-5347

Texas, Houston 19: Marshall, Neil & Pauley, 3513 W. Dallas Ave. Phone JAckson 9-3596

Texas, Lubbock: Bob Carow Company, 2129 56th St. Phone SHerwood 4-9700

THE FLY ASH ARRESTOR CORPORATION, 275 N. First St., P. O. Box 1883, Birmingham 1, Alabama.

Louisiana, Metairie: Factory Sales & Engineering Co., 512 N. Causeway Blvd., P. O. Box 693. Phone VE 3-1843

North Carolina, Charlotte 9: A. M. Stephenson, 2842 Selwyn Ave. Phone EDison 3-8483

Texas, Houston 1: Haylett O'Neill, 2505 Travis St., P. O. Box 1166. Phone JA 9-3879

Virginia, Richmond 21: Massey, Wood & West, Inc., 1626 W. Broad St., P. O. Box 5008. Phone EL 5-1724

GARDEN CITY FAN & BLOWER CO., 801 North 8th St., Niles, Mich.

Alabama, Birmingham 9: Consolidated Engineering Co., 2824 Linden Ave. Phone TRemont 1-4665

Georgia, Atlanta 5: Consolidated Engineering Co., 3272 Peachtree Road, N.E. Phone CEdar 7-1606

Missouri, St. Louis 10: Geo. F. Heath Co., Inc., 4030 Chouteau Ave. Phone JEfferson 1-6167

Texas, Houston 6: Bruce A. Wilson & Co., 1659 Hawthorne. Phone JAckson 6-2741

GRAVER WATER CONDITIONING CO., 216 West 14th St., New York 11, N. Y.

THE GREEN FUEL ECONOMIZER CO. INC., Beacon, New York.

Alabama, Mobile: Industrial Power Equipment Co., 951 Government St. Phone HEmlock 2-7802

Florida, Tampa 1: Pat Flanagan, Inc., 3703 Granada St. Phone 64-6131

Georgia, Atlanta: John A. Dodd, 299 Techwood, N.W. Phone JAckson 3-7331

Maryland, Baltimore 18: Jobe & Co., 2857 Greenmount Ave. Phone BElmont 5-3502

Texas, Dallas 4: Harold O. Knape & Co., 2615 Routh St. Phone RIverside 7-7596

Texas, Houston 4: Harold O. Knape & Co., 3011 San Jacinto St. Phone JAckson 6-2729

HANKISON CORPORATION, College & Pike, Canonsburg, Pa.

Alabama, Birmingham 9: Hayden Eng. Sales Co., 210 Hollywood Blvd. Phone TR 1-0637

Florida, Anna Maria: Gulf Instruments Assoc., P. O. Box 828. Phone 9-7412

Georgia, Atlanta 24: The Measure-Trol Co., P. O. Box 13544, Station K. Phone CEdar 7-5790

Louisiana, New Orleans 18: H. R. Gilbert Co., 1531 Fern St. Phone UNiversity 6-5524

North Carolina, Charlotte: Al Penn-Charlotte, 5151 Randolph Road. Phone EMerson 6-0441

Texas, Dallas 20: Whitson Engineering Co., 2680 Freewood St. Phone FLeetwood 7-9393

Texas, Houston 1: Robt. B. Stockdale & Assoc., P. O. Box 99. Phone CApitol 5-1139

HARTZELL PROPELLER FAN COMPANY, South Downing St., Piqua, Ohio.

Alabama, Birmingham 3: 544 American Life Bldg. Phone FAirfax 2-3394

Florida, Orlando: 1616 Bennet Road. Phone GArden 5-5852

Georgia, Smyrna: 204 Benson Ave. Phone HE 5-0143

Kansas, Kansas City 1: 602 Minnesota Ave. Phone DRexel 1-1580

Kansas, Wichita: 343 Lakeview Drive, Derby. Phone SUnset 8-0341

Kentucky, Louisville 7: 195 Colony Way. Phone TWinbrook 6-6464

Louisiana, Metairie: P. O. Box 394. Phone VErnon 3-5560

Maryland, Baltimore: Worthington Hill Drive, Glyndon. Phone TEnnyson 3-3144

Missouri, St. Louis 19: P. O. Box 4, Webster Groves Station. Phone WOodland 1-7816

North Carolina, Charlotte: 2527 Distribution St. Phone EDison 2-7716

Oklahoma, Tulsa: 316 East 11th St. Phone LUther 4-1076

Tennessee, Chattanooga: 2001 Broad St. Phone 5-3407

Tennessee, Memphis 7: 691 Stage Ave. Phone BR 2-7548

Texas, Dallas 35: 6211 Denton Drive. Phone FLeetwood 7-4289

Texas, Houston 5: 5717 Kirby Drive. Phone JAckson 3-4565

Virginia, Richmond: 4109 West Clay St. Phone ELgin 9-2426

West Virginia, Charleston 31: P. O. Box 3043. Phone DIckens 4-4415

HEIL PROCESS EQUIPMENT CORPORATION, 12901 Elmwood Ave., Cleveland 11, Ohio.

Alabama, Birmingham: Brownlee-Morrow, 745 N. 44th St. Phone LY 2-8143

Florida, St. Augustine: Engineered Products Co., P. O. Box 1097. Phone VAlley 9-3653

Louisiana, Baton Rouge: H. A. Ferguson & Assoc., 2657 Edward. Phone DIckens 4-7719

Tennessee, Knoxville: Rogers & Morgan, 802 19th Street. Phone 3-7942

Tennessee, Memphis 4: R. E. Overman Company, 2065 Union Ave. Phone BRoadway 5-0844

THE HISEY-WOLF MACHINE CO., Galvin & Mt. Hope Aves., Cincinnati 4, Ohio.

Florida, Tampa 9: J. K. Kessler & Associates, P. O. Box 10263. Phone 65-2311

Georgia, Chamblee: Allied Tools & Equipment Co., P. O. Box 253. Phone JA 4-5632

Texas, Dallas 32: J. D. Neal, 1236 Holly Glen Drive. Phone FR 1-8798

ILG ELECTRIC VENTILATING CO., 2850 North Pulaski Road, Chicago 41, Ill.

Alabama, Birmingham 3: 2217 Seventh Ave. South. Phone FAirfax 2-3629

Florida, Clearwater: P. O. Box 989. Phone 3-3783

Florida, Jacksonville: 1628 San Marco Blvd. Phone FL 9-7737

Florida, Miami: 7790 N.W. Seventh Ave. Phone PL 1-4244

Florida, Orlando: P. O. Box 6913. Phone GArden 5-6926

Georgia, Atlanta: 31 Sixteenth St., N.W. Phone TRinity 4-3595

Kentucky, Louisville: 319 W. Jefferson St. Phone JUniper 7-6842

Louisiana, New Orleans: 501 North Jefferson Davis Parkway. Phone HUnter 8-2654

North Carolina, Charlotte: 823 Professional Bldg. Phone EDison 2-6721

North Carolina, Greensboro: 1052 Battleground Ave. Phone BRoadway 3-0566

Oklahoma, Tulsa: 125 W. Third St. Phone LUther 5-9504

Tennessee, Knoxville: 2508 Sutherland. Phone 2-3655

Tennessee, Memphis: 4711 Poplar Ave. Phone MU 5001

Tennessee, Nashville: 816 Eighth Ave. South. Phone CH 2-0541

Texas, Dallas: P. O. Box 35083. Phone FLeetwood 7-6613

Texas, El Paso: P. O. Box 321. Phone KEystone 3-8485

Texas, Houston: 1803 Calumet. Phone JAckson 8-5207

Texas, San Antonio: 109 Barrera Street. Phone CApitol 6-7229

Virginia, Norfolk: 3329 Chesapeake Blvd. Phone ULysses 5-2211

Virginia, Richmond: 715 West Grace St. Phone MIlton 3-7331

THE JOHNSON-MARCH CORPORATION, 3018 Market Street, Philadelphia 4, Pa.

Alabama, Birmingham 4: S. L. Morrow Engineering Co., 113 N. 9th St., P. O. Box 770. Phone ALpine 2-5104

Florida, Tampa 3: Trice M. Bell, 4206 N. Trask St., P. O. Box 15215. Phone REdwood 6-4744

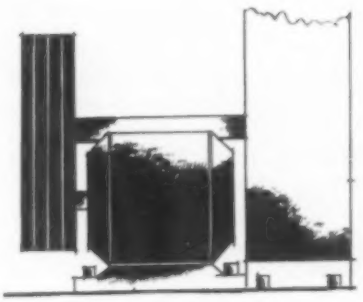
Georgia, Atlanta 9: Osgood & Associates, P. O. Box 7383 — Station C. Phone TRinity 5-7804

Maryland, Baltimore 12: T. E. Byerly Co., Inc., 6229 N. Charles St. Ave. Phone DRexel 7-6610

Missouri, Kansas City 11: Hughes Machinery Co., 4212 Main St. Phone VAlentine 1-7021

Missouri, St. Louis 17: Midwest Machinery Co., 26 Hanley Industrial Court. Phone MIssion 7-3250

North Carolina, Charlotte: Piedmont Products Co., 1420 North Tryon St. Phone FRanklin 6-7441



North Carolina, Charlotte 1: J. R. Rone, P. O. Box 2673. Phone EDison 3-2361

Tennessee, Knoxville 19: Crowell Engineering Co., P. O. Box 10387. Phone 8-5122

Tennessee, Memphis 17: Walter H. Gay, P. O. Box 3452. Phone MUtual 3-2822

West Virginia, Charleston 30: Industrial Equipment Co., P. O. Box 3747. Phone DIckens 3-7606

KAYE & MAC DONALD, INC., 15 Central Ave., West Orange, N. J.

Georgia, Atlanta 3: John L. Underwood Co., 555 Whitehall St., S.W. Phone MU 8-7878

North Carolina, Charlotte 2: J. E. Baker Sales Co., 1419½ Elizabeth Ave. Phone EDison 4-4448

Texas, Houston: Howell Engineering Co., 2510 Travis St. Phone JA 3-9364

THE KIRK & BLUM MANUFACTURING CO., Cincinnati 9, Ohio

Alabama, Birmingham 2: The Gearhart Company, 512 N. 18th St.

Alabama, Mobile: Industrial Power Equipment Co., 951 Government St.

Georgia, Atlanta 19: The Gearhart Company, Gearhart Bldg.

Kentucky, Louisville: Liberty Engineering & Manufacturing Co., Inc., 1450 S. 15th St. Phone ME 5-2655

Louisiana, New Orleans 25: Mid-South Sales Company, P. O. Box 13032

North Carolina, Statesville: General Equipment Co.

Virginia, Martinsville: Nosco Lewis Machy. & Supply Company, 408 Pond St.

Virginia, Richmond 21: Massey, Wood & West, Inc., P. O. Box 5008

KOPPERS COMPANY, INC., 200 Scott Street, Baltimore, Md.

Florida, Tallahassee: W. C. Davis & Associates, 101 Petroleum Bldg.

Georgia, Atlanta: W. C. Davis & Associates, 1371 Peachtree St., N.E. Phone TRinity 5-9658

Tennessee, Chattanooga: H. M. Sawrie & Co., P. O. Box 4146. Phone AMherst 7-3776

Texas, Houston 5: Filters, Inc., P. O. Box 6644. Phone MOhawk 7-6667

THE R. C. MAHON COMPANY, P. O. Box 4666, Detroit 34, Mich.

MAJAC, INC., 23rd St., Sharpsburg, Pittsburgh 15, Pa.

MINE SAFETY APPLIANCES COMPANY, 201 N. Braddock Ave., Pittsburgh 8, Pa.

Alabama, Birmingham: P. T. Richter, 2220 Great Rock Road, Vestavia Hills. Phone TRemont 9-3953

Florida, Orlando: W. L. Tate, 2808 Norris Ave. Phone MIdway 7-2811

Georgia, Atlanta 9: Donald F. West, 1343 Spring St., N.W. Phone TRinity 4-6378

Louisiana, Baton Rouge: E. C. Hansen, 10644 Allyson St. Phone WAlnut 1-8194

Louisiana, New Orleans 15: J. W. Meehan, Jr., 3000 Toulouse St. Phone HUnter 6-5368

North Carolina, Charlotte 5: L. F. Little, 5214 Stonybrook Road. Phone FRanklin 7-5676

Oklahoma, Tulsa 3: J. T. Williams, 1015 S. Cincinnati Ave. Phone LUther 2-4204

Tennessee, Knoxville 19: J. C. Sheehan, 507 Rockingham Drive. Phone 8-9815

Tennessee, Memphis 17: B. G. Tarkington, 5232 Sequoia Ave. Phone MUtual 5-8661

Texas, Beaumont: R. E. Anderson, 5880 Clinton Ave. Phone TWinbrook 2-6227

Texas, Corpus Christi: G. L. Scott, 4722 Wexford Drive. Phone ULysses 2-4706

Texas, Dallas 7: W. H. Gates, 1630 Oak Lawn Ave. Phone RIverside 7-4209

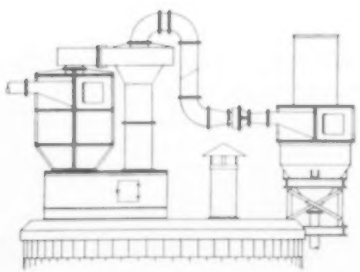
Texas, Houston 6: D. M. Cook, 3745 Greenbriar Drive. Phone JAckson 3-3636

MINNEAPOLIS - HONEYWELL REGULATOR COMPANY, 2753 Fourth Ave., South, Minneapolis 8, Minn.

Kansas, Wichita 16: 2801 South Madison. Phone AMherst 7-5304

Louisiana, New Orleans: 2369 Prentiss Ave. Phone 282-3491

Missouri, Kansas City 30: 4650 East Highway 50. Phone WAbash 3-8725



Oklahoma, Oklahoma City 18: 4501 N. Cooper. Phone JAckson 8-4485

Texas, Dallas 6: 6000 North Central Expressway. Phone EMerson 8-6401

Texas, Houston 1: P. O. Box 2631. Phone WAlnut 8-2451

Texas, San Antonio 13: 2008 Military Drive N. W. Phone DIamond 4-2351

NATIONAL CONVEYORS COMPANY, INC., 25 Industrial Ave., Fairview (Bergen County), New Jersey.

Georgia, Atlanta 3: P. H. Nichols & Co., 400 Whitehead Bldg.

Maryland, Baltimore 18: Lamb Engineering Co., 2125 Maryland Ave.

Missouri, St. Louis 22: Medor, Inc., 10408 Manchester Ave.

North Carolina, Charlotte 9: E. L. Mountcastle, 1024 Broadmoor Drive

Texas, Houston 6: Industrial Handling Engineers, 2115 Lexington Ave.

THE NEW YORK BLOWER COMPANY, 3155 South Shields Ave., Chicago 16, Ill.

Alabama, Birmingham: Brownlee-Morrow Engineering Co., 745 N. 44th St., P. O. Box 3155. Phone LYric 2-8143

Arkansas, Little Rock: Mullins Engineering Co., 1401 Cantrell Road. Phone MO 3-6308

Florida, Tampa 3: Trice M. Bell Agency, 4206 N. Trask St. Phone REgent 6-4774

Georgia, Atlanta 5: Thermal Engineering Co., 314 Buckhead Ave., N.E. Phone CEdar 7-8664

Kentucky, Louisville 7: Ogle Engineering Sales, 132 St. Mathews Ave. Phone TW 5-3372

Louisiana, Metairie: A. G. Kirkwood Co., 1617 Metairie Road. Phone VErnon 1-1081

Maryland, Baltimore: R. L. Hoddinott Co., 2422 N. Charles St. Phone BElmont 5-8532

Missouri, Kansas City 6: Rudolph E. Bade, 922 Walnut St. Phone VIctor 2-5734

Missouri, St. Louis 8: H. C. Sharp Co., 4060 W. Pine Blvd. Phone FR 1-5355

North Carolina, Raleigh: L. R. Gorrell Co. 602 W. Morgan St. Phone TEmple 3-9090

Oklahoma, Tulsa: Thomas Engineering Co., 1325 E. 35th Place. Phone RI 2-3544

South Carolina, Greenville: L. R. Gorrell Co., 4025 Park Place. P. O. Box 4025

Tennessee, Chattanooga: Robins & Bohr, 814 Hamilton National Bank Bldg. Phone AMherst 7-6697

Tennessee, Johnson City: Lancaster Associates, P. O. Box 629. Phone 3200

Tennessee, Memphis 4: R. E. Overman, 2065 Union Ave. Phone BRoadway 5-0844

Texas, Dallas 4: Harold O. Knape Co., 2615 Routh St. Phone RIverside 7-7596

Texas, El Paso: Herlin Engineering Co., 1601 Bassett Ave. Phone KEystone 3-4495

Texas, Houston: Harold O. Knape Co., 3011 San Jacinto St. Phone JAckson 6-2729

Virginia, Norfolk 10: J. A. Hagan, Jr. & Co., 820 W. 21st St. Phone MAdison 2-2751

West Virginia, Charleston 4: Pedley Equipment Co., 314 21st St., S.E. Phone DI 2-6920

NORTHERN BLOWER DIVISION, Buell Engineering Company, 6409 Barberton Ave., Cleveland, Ohio.

Georgia, Atlanta: E. L. Shuff & Assoc., 2130 Maple Drive, N.E. Phone CEdar 7-0215

Missouri, Kansas City 12: Midwestern Power Eqpt. Co., 1214 W. 47th St. Phone VAlentine 1-7407

Tennessee, Memphis 3: Engineered Plant Equipment, 166 Monroe Ave. Phone JAckson 6-6232

Texas, Houston 2: Meyer F. Smith Co., 2314 South Main St. Phone JAckson 8-1131

Texas, Houston 19: Whelan-May Co., P. O. Box 13291. Phone JAckson 6-3697

PANGBORN CORPORATION, 860 Pangborn Blvd., Hagerstown, Maryland.

Alabama, Birmingham 13: Ralph A. Petersen, Dist. Mgr., P. O. Box 9217. Phone TRemont 9-4921

Georgia, Augusta: L. W. Wagner, Dist. Mgr., P. O. Box 842. Phone REgent 6-7258

Maryland, Baltimore: J. C. Pangborn, Jr., Dist. Mgr. Phone ENterprise 9-3505

Maryland, Hagerstown: J. C. Pangborn, Jr., Dist. Mgr., Pangborn Blvd. Phone REgent 9-3500

Missouri, St. Louis 22: E. C. Gilmour, Dist. Mgr., 207 Lombardi-Brooks Bldg., 10406 Manchester Road, Kirkwood. Phone TAylor 2-0212

Texas, Houston 2: B. H. Marks, Dist. Mgr., 201 Scanlan Bldg. Phone CApitol 7-1663

PULVERIZING MACHINERY COMPANY, A Division of American-Marietta Company, 46 Chatham Road, Summit, N. J.

Florida, Lakeland: Linder Industrial Engineering Co. Phone MUtual 6-5133

Georgia, Atlanta 5: Rupulair Company. Phone CEdar 3-3052

Missouri, St. Louis 19: Paul W. Wittke Co. Phone WOodland 1-8494

Tennessee, Memphis 4: R. E. Overman Company. Phone BRoadway 5-0844

Texas, Houston 6: B. A. Wilson Company. Phone JAckson 6-2741

Virginia, Richmond 26: Breeden & Collier Company. Phone ATlantic 2-4256

RENNEBURG, EDWARD & SONS CO., 2639 Boston Ave., Baltimore 24, Md.

Alabama, Birmingham 9: Consolidated Engineering Co., P. O. Box 6011. Phone TRemont 1-4665

Georgia, Atlanta 5: Consolidated Engineering Co., 3272 Peachtree Rd., N.E. Phone CEdar 7-1606

Texas, Houston 4: The J-N-G Company, Box 8251. Phone MA 3-6148

RESEARCH - COTTRELL, INC., P. O. Box 750, Bound Brook, New Jersey.

Georgia, Atlanta 24: Boiler Equipment Service Co., 1079 Alco St., N.E. Phone MElrose 4-7373

Louisiana, New Orleans 12: William S. Huey Co., 202 Board of Trade Annex. Phone TUlane 0409

Maryland, Baltimore 18: Energy Control Corp., 2127 Maryland Ave. Phone BElmont 5-6926

Missouri, Kansas City 2: Hughes Machinery Co., 4212 Main St. Phone VAlentine 1-7021

Missouri, St. Louis 17: Rhodes Equipment Co., 1401 S. Brentwood Blvd. Phone WOodland 2-8820

Texas, Houston 1: Alliger & Sears Co., 2203 Fannin St. Phone CApitol 4-6933

West Virginia, Charleston 30: Industrial Equipment Co., Inc., 913 Brooks St. Phone DIckens 3-7606

J. O. ROSS ENGINEERING DIVISION, Midland-Ross Corp., 730 Third Ave., New York 17, N. Y.

Alabama, Mobile: 951 Government St. Bldg. Phone HEmlock 8-9665

Georgia, Atlanta 5: 3120 Maple Drive. Phone CEdar 3-5349

THE W. W. SLY MFG. CO., P. O. Box 5939, Cleveland 1, Ohio.

Alabama, Birmingham 9: 1831 28th Ave. South. Phone TRemont 9-0221

Louisiana, New Orleans 25: 4424-C Earhart Blvd. Phone 822-1636

Texas, Houston 35: P. O. Box 35312. Phone PArkview 3-3521

THE SPENCER TURBINE COMPANY, 486 New Park Ave., Hartford 6, Conn.

Alabama, Birmingham 9: Robert E. Schneider, 113 Rockaway Road

Florida, Miami 35: E. D. Gruppe Assoc., 3150 N.W. 7th St.

Georgia, Atlanta 12: Hatcher Sales Co., 542 Forrest Road, N.E.

Louisiana, New Orleans 24: Bryner-Spranley, Inc., 5701 Canal Blvd.

Tennessee, Memphis 12: T. J. O'Brien Engr. Co., 169 Scott St.

Tennessee, Nashville 4: Builders Specialties Co., 1523 Demonbreun St.

Texas, Dallas 4: Eggelhof Engineers, Inc., 4331 Belmont Ave.

STERLING BLOWER COMPANY, 791 Windsor St., Hartford 1, Conn.

TORIT MANUFACTURING COMPANY, 1133 Rankin St., St. Paul 16, Minn.

Florida, Orlando: E. E. McCarthy, P. O. Box 1219. Phone GArden 2-6144

Texas, Dallas: R. V. Miles, 2909 Canton. Phone RIverside 7-0595

TRION, INC., 1000 Island Ave., McKees Rocks, Pa.

Alabama, Birmingham 6: Air Engineers, Inc., 3625 First Ave. South. Phone FA 4-3431

Arkansas, Little Rock: Allen Bullard Co., 509 E. Markham. Phone FRanklin 5-8227

D. C., Washington 16: Clifford S. Stephens, 3201 Wisconsin Ave. Phone EMerson 3-2132

Florida, Gulf Breeze: P. H. Hutchinson & Assoc., P. O. Box 610. Phone YEllowstone 2-2717

Florida, Jacksonville: Earl Seibert, Box 86, Ponte Vedra Beach. Phone ATwater 5-6133

Florida, Miami 38: C. Kelsey Sanders, P. O. Box 56, Little River Station. Phone PL 4-9894

Florida, Tampa 9: Robert S. Belcher, 201 S. Woodlynne Ave. Phone REdwood 6-1443

Georgia, Atlanta 3: Walter Strickland Co., 152 Ellis St., N.E. Phone JAckson 5-1611

Kansas, Wichita 2: Ray F. Bauer Co., 434 N. Rock Island. Phone HO 4-0364

Kentucky, Louisville 7: R. L. Craig Co., Inc., 195 Colony Way. Phone TWinbrook 6-6464

Louisiana, New Orleans 25: Devlin Bros., P. O. Box 13428. Phone JAckson 5-7984

Maryland, Baltimore 2: John J. Barry, 501 Keyser Bldg. Phone SAratoga 7-4451

Mississippi, Jackson: Air Filter Sales & Service, P. O. Box 2445, 449 Dory St. Phone 2-7289

Missouri, Kansas City 8: Engineered Equipment Co., 2201 Grand Ave. Phone BA 5669

Missouri, St. Louis 77: H. C. Sharp Co., P. O. Box 7038. Phone FRanklin 1-5355

North Carolina, Charlotte: E. C. Shearon, L. R. Gorrell Co., P. O. Box 6228. Phone EMerson 6-0872

North Carolina, Raleigh: L. R. Gorrell Co., P. O. Box 5742. Phone TEmple 3-9090

Oklahoma, Oklahoma City: Eldon C. Thomas Co., P. O. Box 862. Phone CEntral 6-4541

Tennessee, Knoxville: Rogers & Morgan, 800 19th St. Phone 3-7942

Tennessee, Nashville 3: Air Filter Sales & Service, 1529 Demonbreun St. Phone ALpine 6-3322

Texas, Dallas 4: Harold O. Knape & Co., 2615 Routh St. Phone RIverside 7-7596

Texas, Houston 4: C. B. Roessler, Harold O. Knape & Co., 3011 San Jacinto St. Phone JAckson 6-2729

Texas, Lubbock: Harlan Engineering Co., P. O. Box 151. Phone 2-1302

Texas, San Antonio 6: Langhammer-Rummel Co., P. O. Box 367. Phone CApitol 6-6291

Virginia, Richmond 26: Breeden & Collier, P. O. Box 8752. Phone AT 2-4256

UNION CARBIDE DEVELOPMENT CO., Div. of Union Carbide Corp., 270 Park Ave., New York 17, N. Y.

Florida, Jacksonville: 1252 West Beaver. Phone EL 4-8494

Florida, Miami: Jack F. Spears Co., 2001 S.W. First St. Phone FR 3-0765

Louisiana, New Orleans: C. R. Clingman Inc., 1224 Richards Bldg. Phone 523-6316

Maryland, Baltimore: Better Air Products Co., 3805 Hickory Ave.

Missouri, St. Louis: H. C. Sharp Company, P. O. Box 7038. Phone FRanklin 1-5355

North Carolina, Charlotte: Howard V. Caton Co., 230 N. Torrence St. Phone FRankln 5-2028

Texas, Bellaire: Datum Engineering Company, P. O. Box 314. Phone MOhawk 5-0893

Virginia, Richmond: W. Wallace Neale Company, 2307 Westwood Ave. Phone ELgin 5-7484

West Virginia, Charleston: Pedley Equipment Company, 314 21st St. S.E. Phone Dickens 2-6920

Air and Gas Cleaning Reference Guide for the South-Southwest . . . . . .

U. S. HOFFMAN MACHINERY CORP., 105 Fourth Avenue, New York, N. Y.

Georgia, Decatur: A. J. Kroog Co., 203 Professional Bldg. Phone DRake 7-6711

Kentucky, Louisville: Miller Engineering Corp., 119 East Barbee Ave. Phone MElrose 5-6357

Louisiana, New Orleans: Fred M. Erichson, 5705 St. Roch Avenue. Phone FAirview 2454

Maryland, Baltimore: Hamilton Easter, Inc., 605 Reisterstown Road. Phone HUnter 6-7888

Missouri, St. Louis: Hagedorn & Gannon, 4030 Chouteau Ave. Phone OLive 2-7457

Ohio, Cincinnati 24: Cinco Engineered Products, 1340 Hill Crest Road. Phone KIrby 1-5767

Oklahoma, Tulsa: W. H. Mason Company, 801 West 23rd St. Phone LUther 5-8138

Tennessee, Knoxville: Rogers & Morgan, 800 19th Street. Phone 3-7942

Tennessee, Memphis: Craig Industrial Equip., 1101 Poplar Avenue. Phone BRoadway 5-5777

Texas, Dallas: General Power Equip. Co., 5527 Dyer Street. Phone EMerson 8-4655.

Texas, Houston: Bruce A. Wilson Co., 1659 Hawthorne. Phone JAckson 6-2741

Virginia, Lynchburg: Campbell King Co., 611 Riverside Drive. Phone VIctor 5-9479

West Virginia, Charleston: Mason & Barry, 603 Brooks Street. Phone DIckson 4-4415

WESTERN PRECIPITATION DIVISION of Joy Manufacturing Company, 1000 West 9th St., Los Angeles 15, Calif.

Alabama, Birmingham: Crandall Engineering Co., 601 Tenth St. North. Phone AL 1-9262

Florida, Mulberry: Florida Conveyor & Equipment Co. Phone HA 5-1137

Georgia, Atlanta 5: Western Precipitation Div., Joy Mfg. Co., 3252 Peachtree St., N.E. Phone CEdar 3-6255

Kentucky, Louisville 5: The Merrick Co., Inc., 1905 Bardstown Rd. Phone GI. 1-4811

Missouri, Kansas City 5: Harry McPherson, 424 Dwight Bldg., 1004 Baltimore Ave. Phone HA 1-0744

Tennessee, Chattanooga 5: A. J. Brown Co., 440 Fazier Ave. Phone AM 7-8174

West Virginia, South Charleston 3: Mechanical Products Co., 411½ D Street. Phone RI 4-2041

WESTINGHOUSE ELECTRIC CORPORATION Sturtevant Division, Damon St., Hyde Park, Boston 36, Mass.

Alabama, Birmingham 3: V. E. Clive, 2008 Eighth Ave. South. Phone ALpine 2-7014

Florida, Tampa 9: C. H. Holman, 4062 Henderson Blvd. Phone 8-0305

Georgia, Atlanta 2: J. K. Jernigan, 1299 Northside Drive, N.W. Phone TRinity 4-1641

Louisiana, New Orleans: J. L. King, 400 N. Carrollton Ave. Phone HUnter 6-6141

North Carolina, Charlotte: J. W. Thompson, 2001 Morehead St. Phone FRanklin 7-3471

North Carolina, Greensboro: A. J. Merkle, 707 Guilford Bldg. Phone BRoadway 3-5551

Texas, Dallas 1: V. E. Barnes, 1232 Fidelity Union Bldg. Phone RIverside 1-5231

Texas, Houston 2: J. L. Ibison, 507 Dallas Ave. Phone CApitol 4-7791

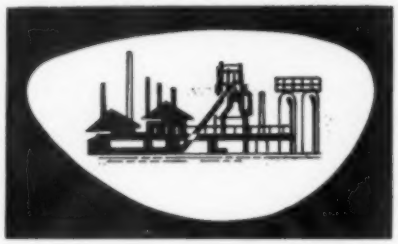
WHEELABRATOR CORPORATION, 1494 S. Byrkit St., Mishawaka, Indiana.

Alabama, Birmingham 6: L. J. Wieschaus, 8436 First Ave. North. Phone VErnon 6-6236

Georgia, Atlanta 5: W. P. Burdakin, 4710 Dudley Lane, N.W. Phone BLackburn 5-7369

Missouri, St. Louis 19: F. E. Noyes, 9313 Manchester Road. Phone WOodland 1-6959

Texas, Houston 8: E. P. Clarke, 627 W. 19th St. Phone UNderwood 4-1733



OTTO H. YORK COMPANY, INC., 6 Central Ave., West Orange, N. J.

Louisiana, Metairie: Factory Sales & Engineering Co., 512 N. Causeway Blvd., P. O. Box 693. Phone VErnon 3-1843

Missouri, St. Louis 17: Process Engineering & Equipment Co., 9011 Manchester Road. Phone WOodland 2-5676

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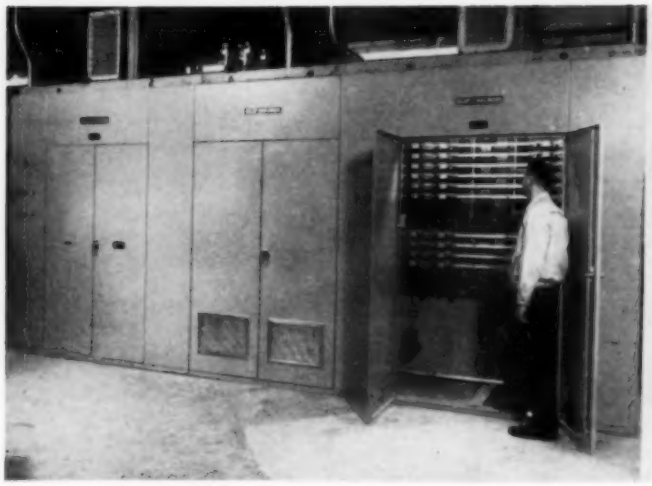
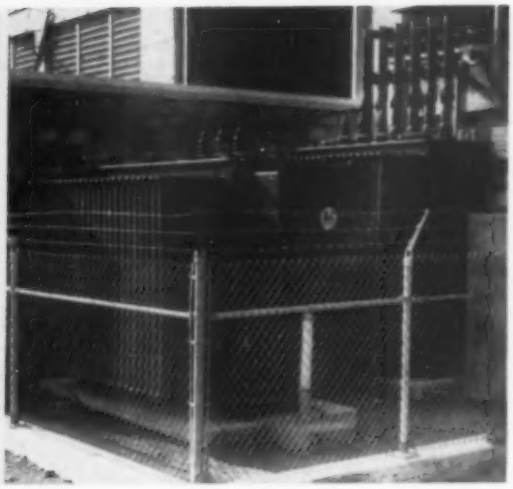


This silicon rectifier with its reactor and rectifier transformer are designed for a 3-phase, 60-cycle, 13.8-kv a-c supply.



The recently installed 4400-kva, 3-phase, 13,800-volt saturable core reactor provides full range control.

Oak Ridge National Laboratory . . . . . Oak Ridge, Tennessee

Silicon Rectifier and Controls

A NEW DUAL voltage 3500-kw regulated silicon rectifier d-c power supply was recently added to an existing 600,000-volt d-c silicon rectifier installation at Oak Ridge National Laboratory operated by Union Carbide Corp. for the U. S. Atomic Energy Commission for use in its nuclear fusion program.

The new rectifier, one of the largest of its type, has a dual rating of 3500 kw at either 1000 or 500 volts with a rating of 3500 amperes at 1000 volts or 7000 amperes at 500 volts d-c accomplished by means of a series parallel reconnection arrangement on the d-c output.

Magnetically-confined, direct-current arcs are being studied in the controlled fusion program at Oak Ridge. These energetic, high-vacuum discharges have been developed as an integral part of the direct-current experiment system which provides trapping and storing of high energy ions in an evacuated magnetic volume. Molecular deuterium ions are accelerated by the 600-kv rectifier into the volume and dissociated to the atomic state by the arc.

The new power supply features a fully automatic constant current type of d-c output characteristic which is provided by a full range saturable reactor and magnetic amplifier control scheme. The output can be preset to provide constant current between 25 and 100 per cent of full load current.

To provide this full range control at the site is a newly installed 4400-kva, 3-phase, 13,800-volt saturable core reactor, largest ever built by Allis-Chalmers Pittsburgh Works. The 13.8-kv power comes through the reactor's underground cable to the pothead compartment at the end of the tank, passes through the reactor coils and to the primary windings of the 3-phase rectifier transformer through cover bushings. A small amount of d-c control power is introduced through bushings in a compartment on the side of the reactor case and stepless variation of current from 5 to 100 per cent of full load is obtainable in this manner.

Allis-Chalmers components now at Oak Ridge include the 600-kv silicon rectifier previously furnished with its associated control for indoor installations; the new silicon rectifier with its reactor and rectifier transformer designed for a 3-phase, 60-cycle, 13.8-kv a-c supply, and a main d-c disconnect switch used for isolation purposes.

REPRINTS AVAILABLE

See Free Offer — P. 12

Inspection Reports, Electrical Distribution, Big Steam Plant Description, Orifice Meters, Water Treatment, Insulation, Gas Cleaning, Epoxy.

MANAGEMENT CLINIC

Conducted by ROBERT H. EMERICK, North Charleston, S. C.

Controlling Absenteeism in Industrial Plants

Question . . . . . .

IS THERE ANY "best" method for controlling absenteeism in an industrial plant?

We endeavor to provide the same treatment for all our employees, but have considerably more trouble in some departments than in others. So far we can't explain this rationally, as it seems everybody has a different reason for staying away.

Suggestions . . . . . .

IF BY THE TERM "best method" a panacea is meant, we don't know of any.

Control of absenteeism starts with the identification of causes, and this identification is often difficult to make for reasons of dissemblance lying deep in human nature.

Nearly all *true* reasons for absence, excluding illness, are nurtured in one or more of the following conditions:

1. The employee doesn't like his working environment. The trouble may be in faulty lighting, unsatisfactory control of temperature and humidity, inadequate or dirty washrooms, even in uncomfortable chairs or benches that produce excessive fatigue by the end of the day.

2. Certain departmental or company policies are regarded as unnecessarily restrictive and irritating.

3. An individual employee dislikes his boss.

4. An individual employee feels unjustly treated for a reason that can't be dragged into the open as a grievance, and consequently expresses his displeasure in the mute presence of his empty chair.

5. A lack of interest in the work. This is a common result of assigning an employee to a job that can be handled by one with a much lower I.Q.

6. The employee lives too far from the job. Long and arduous round trips are discouragers of steady attendance.

Of these six groups of reasons for absenteeism, the first two are the most serious because they reflect directly on the way Management is conducting its operations. Departmental troubles suggest an unawareness of environmental needs, and inadequate supervisory attitude, or a combination of these. If the absenteeism is plant wide, we have a clear indication that top management has reached a time for a little self-examination. This is just another way of saying, "When the whole class fails, there's something wrong with the teacher."

A suggested treatment for absentees in the No. 3 and No. 5 categories, is to transfer them to other bosses, other work. This sometimes works with grieved employees, also. As for one who lives too far away, and won't move closer, a replacement is the only ultimate cure.

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Florida Plant Protects Equipment Against Chemical Action

Special Coating Solves Corrosion Problem

By R. E. GACKENBACH
Engineering and Construction Division of American Cyanamid Company

EXPERIENCE in American Cyanamid Company's Santa Rosa, Florida, plant for production of Creslan acrylic fiber indicated that the polymer solvent, used in the manufacture of spin dope, presented a tough problem with respect to choice of materials of construction.

This solvent is very corrosive to both carbon steel and low alloy steel. A further complication was the fact that the corrosion by-product is colored and, in the manufacture of a white product, danger of discoloration could not be tolerated.

Normal painting was out of the question because the solvent happens to be an excellent paint remover. Vinyl paints were generally considered the best type available for the purpose at the time this new facility was constructed, but our experience indicated that repainting would be required within nine to twelve months.

We even considered the use of aluminum or austenitic stainless steel Type 316 for construction, since both of these materials are relatively unaffected by the corrosive agent. But we ran into other difficulties when we contemplated using these materials. Aluminum does not have sufficient strength for the structural members and for certain of the process vessels. It also tends to pit under the environmental conditions in the Florida coastal area. Stainless steel Type 316 was considered fine for vessel fabrication but it is too expensive to consider for structural members.

Material Selected

We decided to use carbon steel for the structural members, stairways, platforms and handrails as well as some of the piping and process equipment. We then faced the problem of finding a suitable coating to protect the metals from the corrosive solvent and the environment.

Investigation revealed that a relatively little known product, Kolmetal, appeared to have the protective properties required. After two years of service in this corrosive environment, we are glad to report that, with the exception of routine maintenance, we are securing optimum protection.

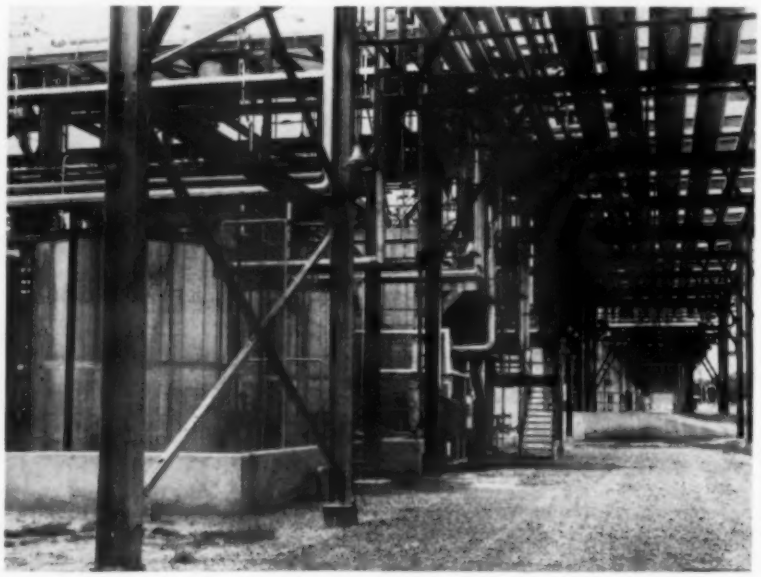
Application Procedure

A total of 40,200 square feet of surface was coated with Kolmetal furnished by Emjay Maintenance Engineers. It was applied to the ammonia storage tank and platform, steel piping, unloading platform framing, cast-iron and steel pump bases, columns, structural steel framing for the evaporator and various tanks, exterior of dope tank and heater, cooler, ejectors and flash tank, stair stringers, yard piping and other surfaces.

Kolmetal is a plastic coating rather than a paint. It is a mixture of finely pulverized aluminum in a plastic base. The finish coat is hard, smooth and yet ductile enough not to crack or blister or peel when struck repeatedly with a hammer or bent to a 45 degree angle. It can be polished to a bright finish and keeps its finish and adhesion over a wide temperature range — from minus 65 degrees to approximately 150 F.

Prior to application of the Kolmetal coating the steel surfaces were prepared by wire brushing and flame cleaning, in areas where the use of flame was permissible. The clean surface was then treated with a material called KIP 100, a highly active complex of iron and phosphate designed to increase the protective qualities of the final finish. A prime coat of Kolmetal was then applied, and followed by finish coats to a minimum dried film thickness of 7 mils.

Distinguishing mark of American Cyanamid Company's Santa Rosa plant is overhead pipe rack running virtually the entire length of production facilities. Racks and piping were coated with Kolmetal to protect them from corrosive atmosphere.



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Planning to Burn Gas,

You can fire *ANY ONE* or *ALL THREE*

Inside the Turbo Furnace at Sterlington Steam Electric Station of Louisiana Power and Light Co. Overall width 54′—7⅞″, depth 24′—0-⅜″. No. 1 firebrick rubble covers the furnace floor. Twenty Riley Directional Flame Burners are arranged for opposed firing on front and rear walls. Burners are shop fabricated assemblies. Burner close-up shows directional vanes, two

The Riley TURBO FURNACE unit is one of the major furnace design advances in recent years for the more efficient utilization of fuels. It is known as a multifuel unit primarily because of its ability to produce similar furnace exit gas temperatures with gas, oil, coal or other solid fuels. This phenomenum is due to the fact that natural gas, which ordinarily burns with a non-luminous flame, burns in a TURBO FURNACE with a luminous flame similar to oil and coal. In a TURBO FURNACE, fuels are burned with extremely high turbulence at the furnace bottom.

Much of the unusual combustion efficiency is due to opposed firing with Riley Directional Flame Burners specially designed for firing multiple fuels singly or in combination. These fuels may be pulverized coal, oil, gas, or other special solid fuels such as fluid coke or lignite.

Water Cooled Burner

The Riley Directional Flame Burner is designed for opposed firing on one level. Each Riley Directional Flame Burner is installed as a unit complete with water cooling tubes which are welded to the waterwall circulation system. The waterwall tube arrangement provides maximum cooling of directional vanes, nozzles and other burner parts and reduces to a minimum the possibility of slag adhesion when coal is being burned. No burner refractories are required.

Coal Burning

Two or three burner nozzles per burner are provided when coal or other solid fuels are to be burned. In this way the coal streams are more evenly distributed across the furnace to assure good mixing of fuel and air in the furnace.

Oil Firing

A retractable type oil gun is inserted thru the center slot so as to provide complete mixing of the spray with the air stream. Oil can be burned with either steam or mechanical atomizing equipment.

Gas Firing

Gas is fired thru guns of high alloy stainless steel. High capacity burners have a gun in each side slot. Gas guns can be installed for mechanical retraction.

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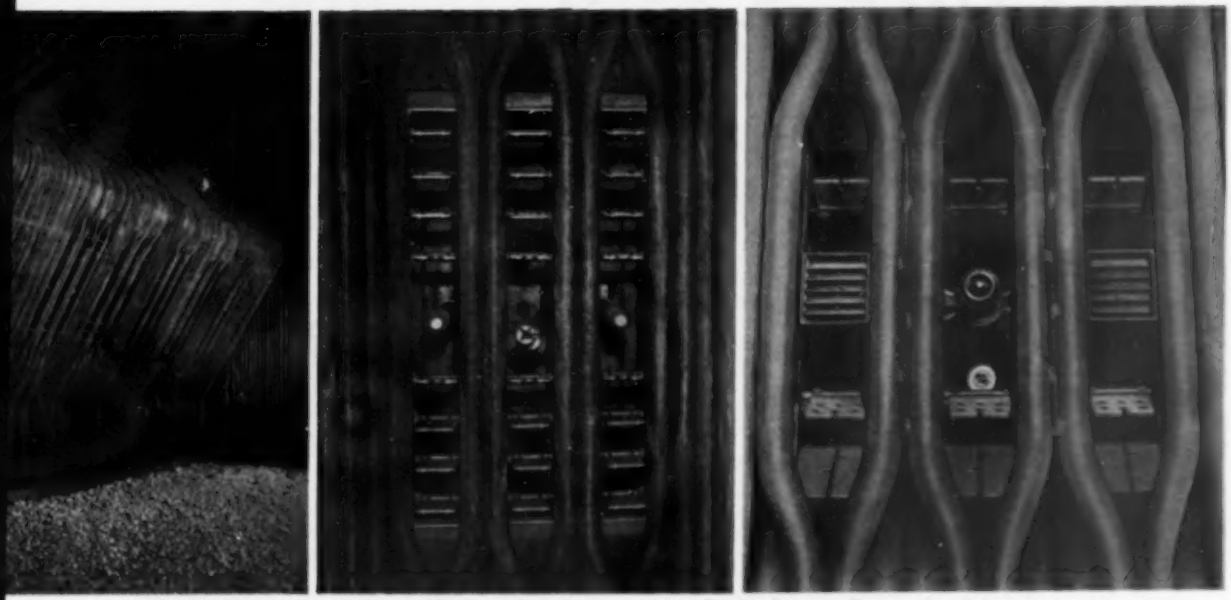
- **The ability to fire multiple fuels: gas, oil and a wide range of solid fuels**
- **A low cost and quick conversion to solid fuels with initial gas/oil firing**
- **Higher heat release with lower overall structure**
- **Minimum Superheater/Reheater metal temperature variations across full width of furnace.**
- **No restrictions on furnace widths.**
- **One level burner operation.**

Oil or Coal?
in a RILEY TURBO FURNACE



gas guns, gas electric ignitor, observation port. Burner can easily be converted to oil and coal firing. At far right is a Directional Flame Turbo Furnace Burner for firing coal, oil, and gas. Note the complete absence of burner refractory.

Directional Vanes

Each slot is provided with directional vanes to project secondary air into the furnace so as to secure the desired placement of flame for most effective combustion. The vanes above the burner centerline and those below each have separate controls. Vanes are made of high heat resisting alloy.

Burner Shut-Off

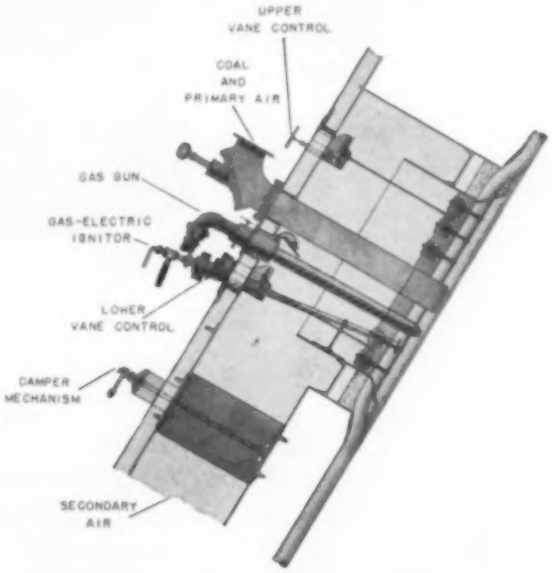
Each burner has a separate secondary air shut-off damper which can be locally or remotely controlled.

Riley Gas-Electric Ignitors

Riley Gas-Electric Ignitors are available with Riley Directional Flame Burners.

Pressurized and Non-Pressurized Operation

Riley Directional Flame Burners are designed so that they can be used either with pressurized or non-pressurized furnaces.



For the complete description of the Riley TURBO FURNACE write:

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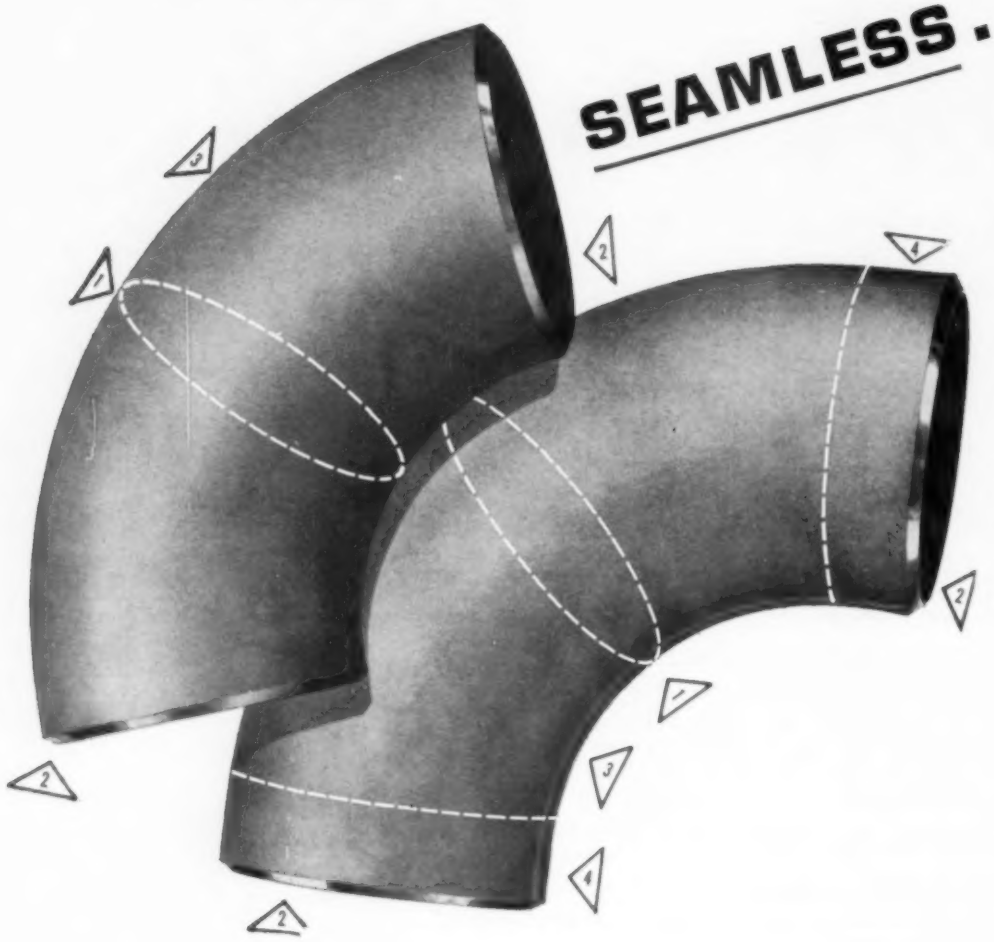

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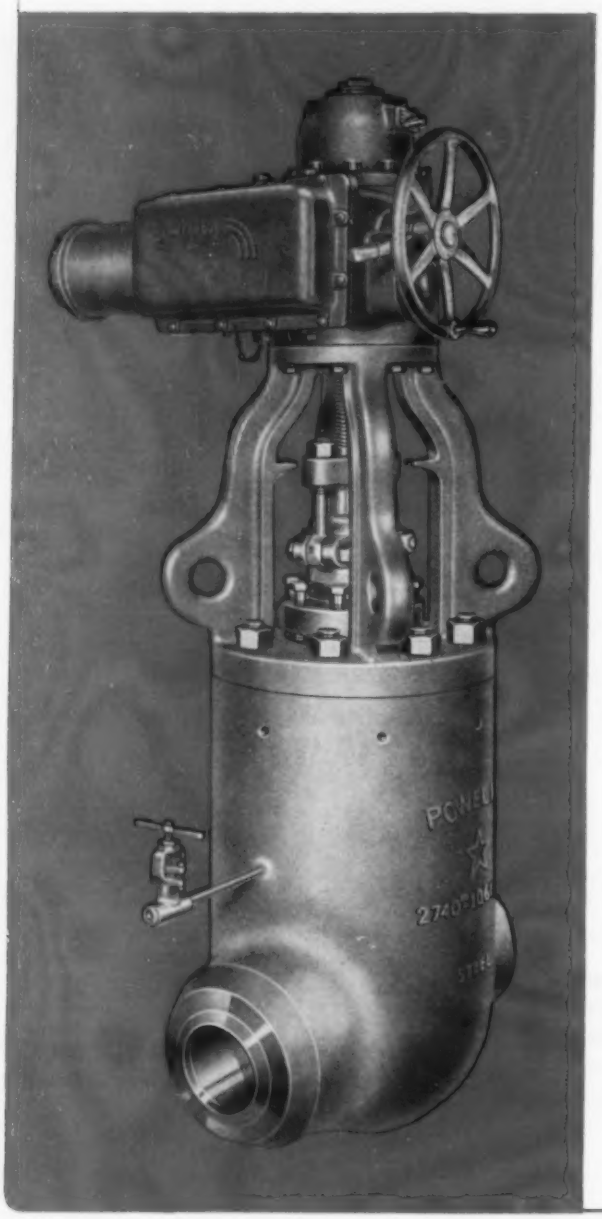

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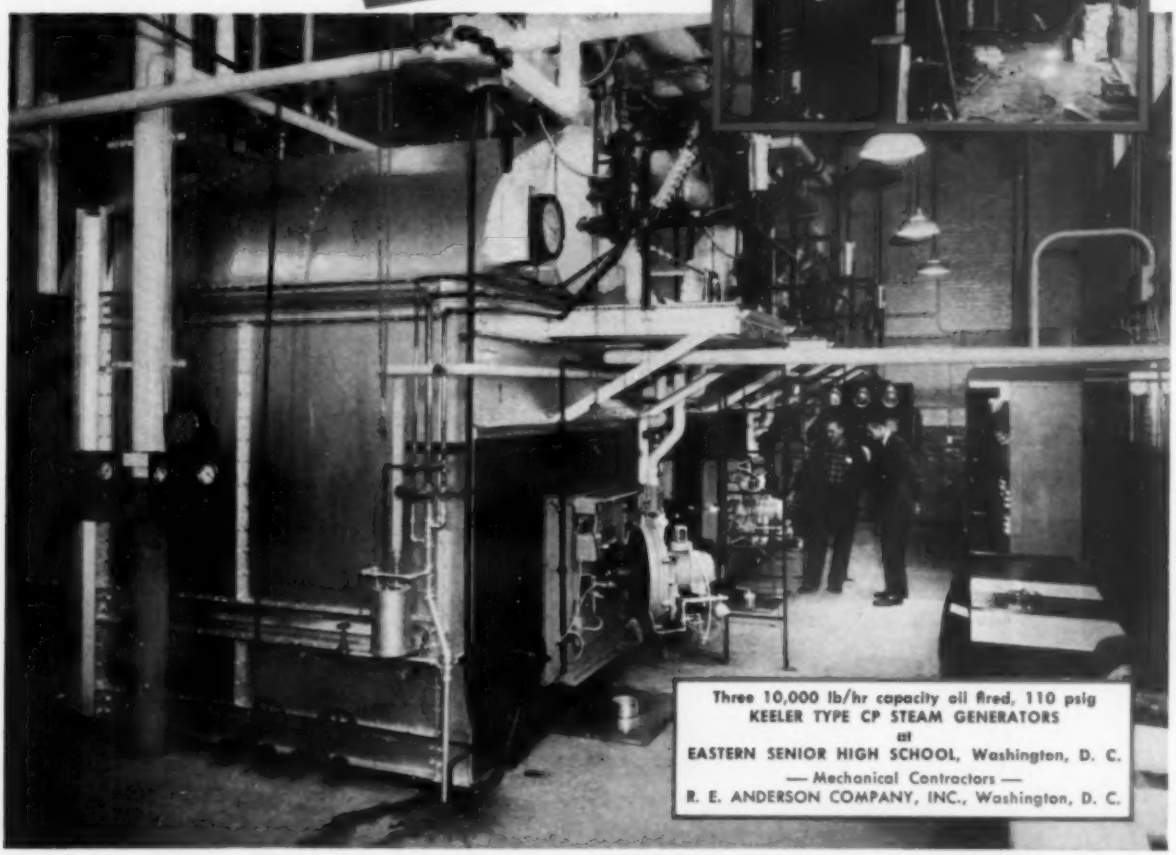

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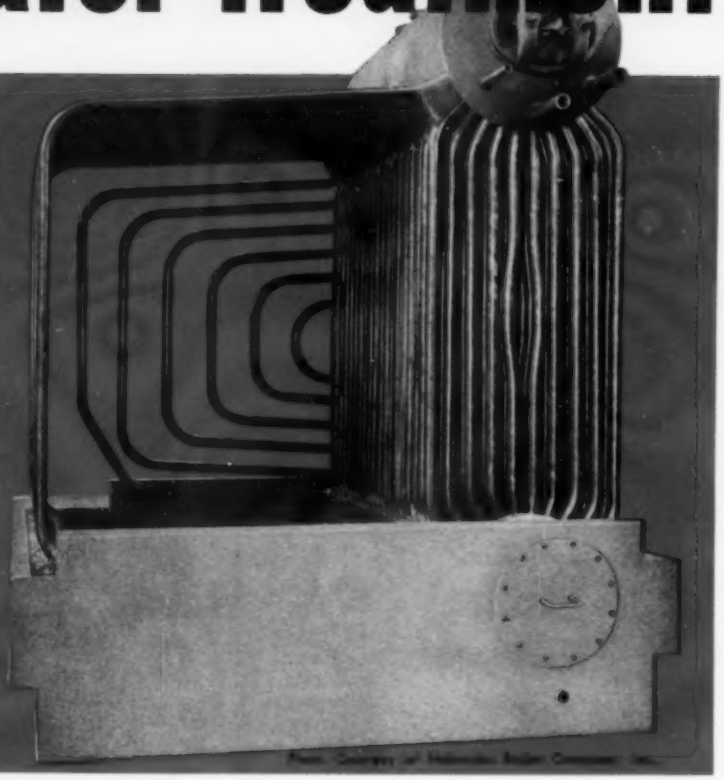
prevents efficiency fade-out... protects equipment against scale, rust, corrosion



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ROOF TOP

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*FRANCISCO & JACOBUS
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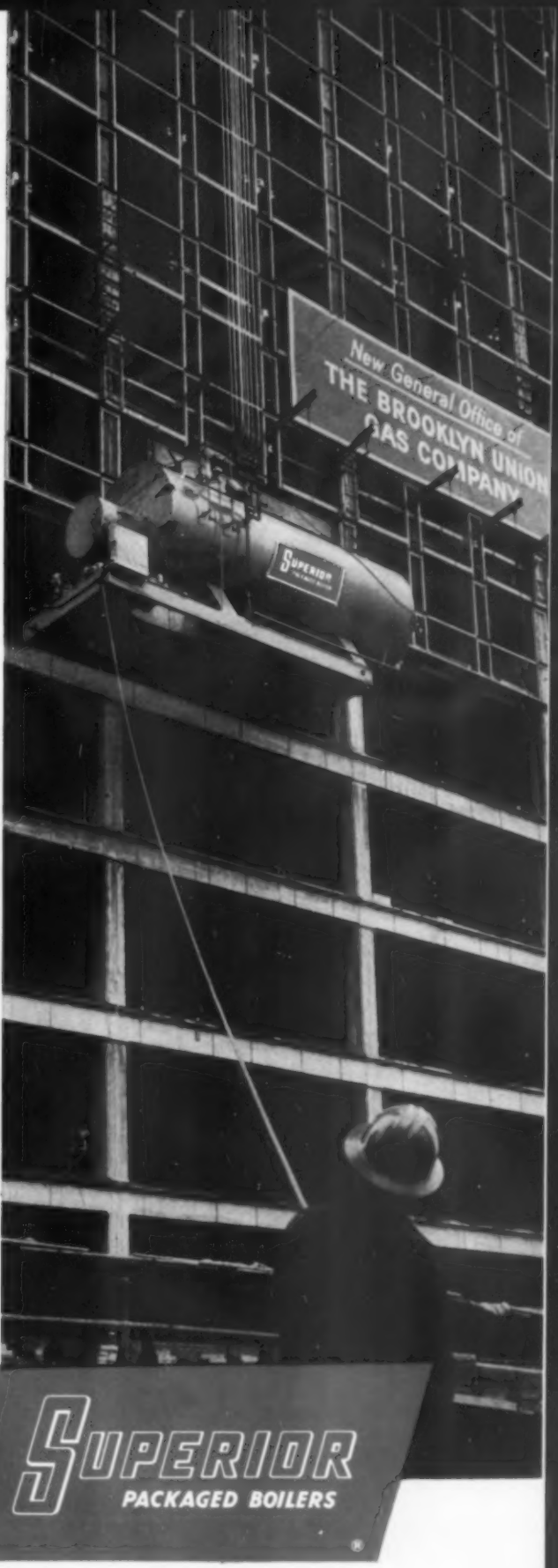
SUPERIOR COMBUSTION INDUSTRIES INC.

TIMES TOWER, TIMES SQUARE, NEW YORK 36, N. Y.



Texas Process Plant Saves Up To $19,000 Every Two Years

BIMETALLIC HEAT EXCHANGER TUBES

A MAJOR CHEMICAL process plant is saving $12,800 to $19,000 every two years since it found a way to successfully handle two dissimilar corrodents simultaneously in one key heat exchanger.

Union Carbide Chemicals Co., at Texas City, Tex., was having a serious corrosion problem with one vertical condenser handling hot corrosive process gases on the tube side and treated brackish river water on the shell side.

This condenser contains 475 tubes ¾" od by 12' long. The tubes have to be of austenitic stainless to prevent corrosion and contamination of the product. But with every stainless grade put into service, stress corrosion cracking and pitting showed up sooner or later on the cooling water side. There was no attack on the inner wall.

The high inlet temperature, in excess of 150 C, raises the skin temperature of the tubes, causing a severe corrosion problem at the inlet end of the condenser. Cycle cooling water, which enters at 40 C, precipitates salts on the outer tube surface. This action causes pitting and stress corrosion cracking. Salt scale builds up and acts as insulation, thus making the tube surface still hotter and accelerating corrosion. The cycle water runs 200 to 500 parts per million chlorides.

Type 347 stainless steel tubes were used in the original design, but these failed from the corrosive attack of the chloride ions after about 1½ years of service. Then the company tried Type 316 stainless tubes which had better corrosion resistance than necessary for the process side, but were still inadequate for the water on the shell side. High temperature and scaling on the tube walls caused widespread cracking, with no improvement in service life.

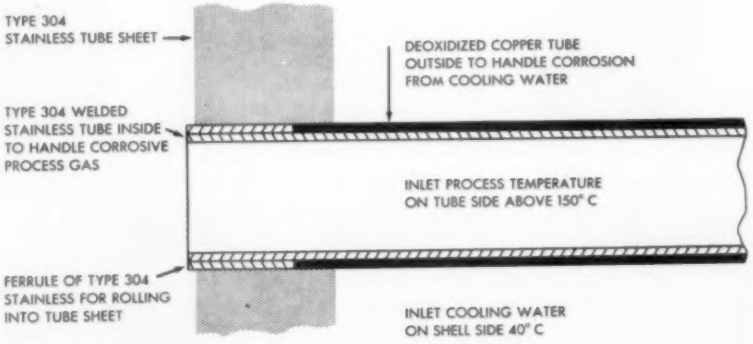
The company then tried tubes of a special stainless grade (carbon 0.20% max, chromium 23.00/28.00%, nickel 2.50/5.00%, molybdenum 1.50/2.50%). These tubes lasted about 22 months. A second bundle of the same type tubes was installed after special heat treatment to relieve residual stresses. These tubes lasted a little longer than two years before they failed too. They resisted stress corrosion cracking, but they did not sufficiently resist the chloride ions which caused pitting.

Union Carbide next put in a bundle of bimetallic tubes supplied by the Alloy Tube Division of Carpenter Steel Co. These were 18 gauge Type 304 welded stainless tubes on the inside, mechanically bonded to 0.035" deoxidized copper tubes on the outside. Type 304 ferrules were used on the ends of the tubes for effective rolling into Type 304 stainless tube sheets.

As of January 1960, the bimetallic tubes had been in uninterrupted service for more than four years. Up to that time, they already had lasted twice as long as the most effective bare tubes had

Illustration of typical stress cracking found on the austenitic stainless steels.

Cross sectional view of bimetallic tubes showing how they fit into tube sheet. Tubes are 18 gauge Type 304 stainless x 12' long inside 0.035" deoxidized copper.


TYPE 304 STAINLESS TUBE SHEET
DEOXIDIZED COPPER TUBE OUTSIDE TO HANDLE CORROSION FROM COOLING WATER
TYPE 304 WELDED STAINLESS TUBE INSIDE TO HANDLE CORROSIVE PROCESS GAS
INLET PROCESS TEMPERATURE ON TUBE SIDE ABOVE 150° C
FERRULE OF TYPE 304 STAINLESS FOR ROLLING INTO TUBE SHEET
INLET COOLING WATER ON SHELL SIDE 40° C

previously. They had caused no trouble and required no maintenance other than a periodic flushing of the shell side with cleaning acid. The company expects the bundle of bimetallic tubes to last at least eight to ten years overall.

Now eliminated are all the costs formerly involved when the unit was down for repairs. Replacement of the tubes alone used to cost between $10,000 and $15,000. Cost of rebuilding the bundle ran between $800 and $1,000. Whenever the condenser was out of service, it meant loss of one-seventh of the plant's entire production during the time required for maintenance or replacement. The loss during the brief time it took to install an available replacement bundle amounted to $2,000.

In summary, the plant now saves anywhere from $12,800 to $19,000 every two years — the average frequency with which the bare tubes had to be replaced. The total savings, prorated over the life expectancy of the bimetallic tubes, amounts to at least $51,200 for eight years of trouble-free service, or at most $95,000 for ten years of trouble-free service.

Packaged Air Make-Up Units

GRANITEVILLE Company, Graniteville, S. C., has recently installed four packaged air make-up units to replace air exhausted to atmosphere by bleachery processing equipment.

Some 1,000,000 cfm are exhausted by bleachery equipment, and 35 to 40 exhaust hoods continually discharge this processing air to atmosphere.

Of the 1,000,000 cfm exhausted, only about 60% is replaced by the heating and ventilating systems and by the circulation system designed to prevent condensation on the ceiling. Without an additional air supply, this loss of air would produce a negative pressure and cause drafts at doorways and windows as air tried to rush in to replace that which was exhausted. Exhaust fans also would have to work harder. Their work could be likened to drawing air from a bottle.

The new packaged make-up units supply 60,000 cfm each, and bring the total replacement air up to 80% of that exhausted. This is more than adequate and even allows for additional processing equipment before additional make-up capacity will be required.

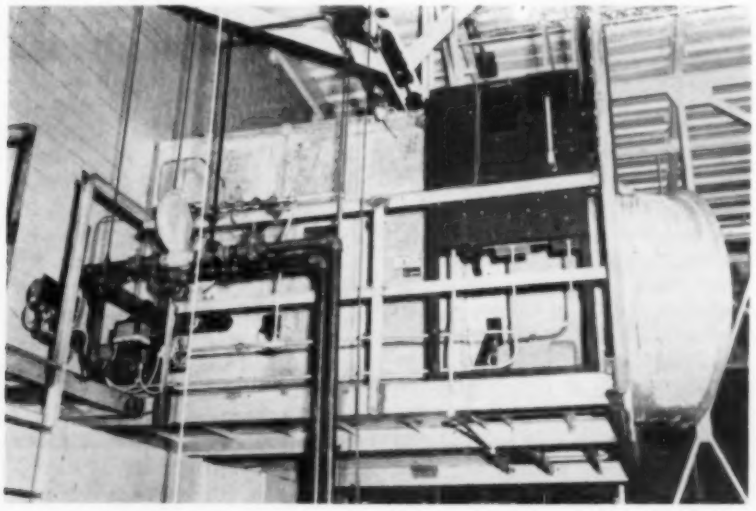
The air make-up units are of a relatively new standardized design and were supplied by the Atlanta office of the J. O. Ross Engineering Division of the Midland-Ross Corporation.

One of the new make-up units is illustrated. It comprises a 7′ high x 7′ wide x 8′ long galvanized enclosure equipped with two access doors. The end of the enclosure which fits into the outside wall opening is fitted with louvers, bird screens and shutdown dampers. The other end is equipped with an axial fan which draws air from out of doors and directs it into the bleachery.

The photograph also shows fuel supply equipment that regulates fuel and air to internal burners which heat incoming air in the winter. The make-up unit is insulated with a 3" thickness of rock wool all around to prevent winter condensation. Natural gas with propane as stand-by is used as the fuel, largely because of lesser maintenance requirements in comparison with steam.

To the right in the illustration is the back of the control panel which contains, among other things, an indicating controller which automatically controls fuel to the burners so that outside air will be brought up to as high as 80 F. The air make-up unit is mounted near the ceiling, some 18 feet above the floor.

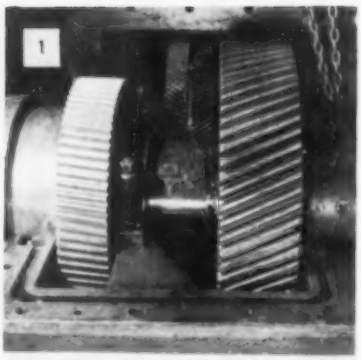
The small photograph shows a close-up of the burner and the louvers and shut-down dampers in the end wall.

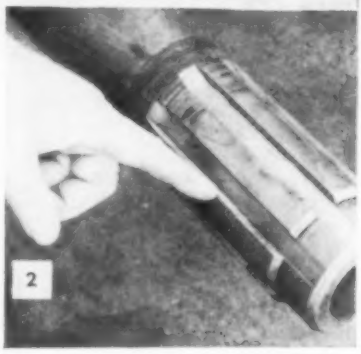


Left — Packaged make-up unit.

Below — Close-up of burner.

Custom Lubricants Reduce Maintenance





A SOUTHERN manufacturing company—engaged in the extraction of oils from cotton seeds, soy beans and other vegetables — has realized great savings in maintenance, labor, parts, and machine down time by choosing custom lubricants for use on hardworking processing machinery.

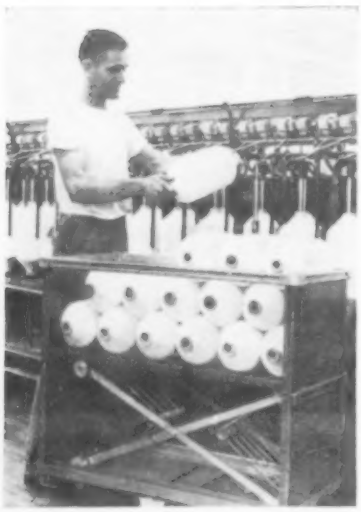
Cooked seed meats at 25 F are fed to four screw press extracting machines. Operating at 36 to 45 rpm, these expellers place a heavy strain on their drive gears and the lubricant in which they run.

For the helical and spur gears (See Fig. 1) of the expeller drive units, and the hypoid gears and Timken roller bearings of their two cookers, the company selected a custom lubricant — Keystone SR No. 1. The value of this special lubricant has been proved by 28 months (more than 16 thousand working hours) with no bearing or gear damage due to lubricant breakdown.

As summed up by the company superintendent, "By using a lubricant specifically matched to the need, we were able to run our expellers for more than four operating seasons without changing the lubricant. Also, a laboratory test just made shows it to be okay for continued use into the fifth season. There has been no accumulation of gummy material on gear spokes nor sludge in the gear cases. Seems like there is so little wear on the gear teeth, they have not really seated themselves even after this length of service."

The company had been noting a corrosive condition on the splines which connect the drive to the screw press, due to ammonia and some acid in the cotton seed oil. The edges were becoming rounded — not remaining sharp as they should have been. Seeking a solution, they called in the Keystone Engineers who recommended an acid resistant lubricant No. 5P8 Medium. A coating was put on the spline and an inspection made six months later showed that deterioration had been stopped. See Fig. 2. All splines are now being protected with the same lubricant. This grease is also used on expeller case bolts and makes the nuts easier to remove.

Floating Bottom Truck Eases Work Load



SPECIAL MATERIALS handling equipment often allows greater production without increasing the work load of employees. It also reduces effort, saves time, and cuts exertion to a minimum.

A large textile mill got these results recently when it purchased Kennett Unilevel trucks with "floating" bottoms to transport heavy yarn packages. Handling these packages in conventional floor trucks caused excessive fatigue because of the necessity of bending over and reaching down for the contents. Also, personal injuries were an ever-present hazard.

The "floating" bottom Unilevel trucks, made by National Vulcanized Fibre Co., eliminated this problem. They have a spring-loaded hardwood bottom supported by heavy-duty torsion springs which permit the bottom to move up or down as the weight on it varies. This keeps the truck's contents at waist level always. Because workers handle the heavy yarn packages without having to bend over, fatigue and risk of personal injury are reduced.

The truck is both light and durable. It is made of vulcanized fiber, a tough, durable material with a smooth surface that minimizes snagging of fibers. It resists abrasion and impact and is easy to clean.

Briefs from Annual ASME Meeting . . . . . By John F. Lee

New Developments and Applications

THE ANNUAL ASME meeting revealed a great many new thoughts which are of considerable value to the industrial world. Whether in regard to new uses of radioisotopes, better aircraft maintenance, or the cleaning of industrial plants, there was material in most of the papers which can mean a great deal in the rapidly changing technological world where competition grows keener every day.

Radioisotopes

Paul C. Aebersold, Director of Isotopes Development for the AEC said that radioisotopes (radioactive forms of different chemicals, often man made, are "truly the success story of atomic energy." His comments on progress in this field were covered in some detail on page 16 of the January issue of SPI.

Chemical Cleaning

The "medicine man's" techniques are still around. But those techniques are not doing plant owners any good. Chemical cleaning of plant equipment, to combat rust, corrosion and fouling hasn't risen much above the secret snake oil formula stage according to Charles M. Loucks, consulting chemist, Materials and Methods, Inc., Westlake, Ohio.

"Some of us may argue that chemical cleaning, as practiced, is not an activity that is worthy of the name 'engineering'; that it is a bunch of guys peddling truckloads of muriatic acid and a lot of packages of 'secret' proprietary 'medicines' that are claimed to work wonders but we must not ask questions. While plant equipment has grown progressively better over the decades, methods of keeping the equipment in trouble-free operation have not changed, in some cases, in twenty years. It is true, however, that some companies are assigning able engineers and chemists to be specifically concerned with the chemical cleaning aspects of plant maintenance. Perhaps service contractors who clean machinery will also compete with each other to come up with newer, better technical developments. The competition up to now has tended to "see who could haul a load of acid cheapest."

Solution of the cleaning problem isn't so easy. Knowledge of the problems involved is divided among engineers, maintenance people and chemists, none of whom seem able to get together. Chemical manufacturers do invest money in obtaining knowledge of new materials that they hope to sell later at a profit. They send out data sheets and samples and they have technical service people who know the properties of the materials. But their knowledge of maintenance problems is limited.

Several benefits are suggested to be hoped for from technical progress in chemical cleaning. These include: less time in actual cleaning of boilers; cleaning systems with materials other than muriatic acid, which can corrode metal; and less fouling in process and refinery equipment.

William E. Bell, technical service department, Charles Pfizer and Co., Inc., Brooklyn, New York, has revealed an analysis of the effect on iron and steel of citric acid solutions. Although some citric acids have been widely used over the past eighteen months, the ammoniated form, which may have several advantages, has been little employed, he reported.

His tests showed that ammoniated citric acid gives a lower inherent corrosion of bare metal and reacts more quickly on some deposits. Reactions between the cleaners and metals have not been completely described or analyzed and it is a fact that the untility of citric acid in chemical cleaning is more advanced than the science.

H. J. Vyhnalek, supervisor of the plant chemistry unit for the Cleveland Electric Illuminating Company, has shown that a knowledge of the chemical composition of isolated deposits and the amount of corrosion which can be tolerated are the important factors in determining when separate cleaning stages are necessary for various boilers.

In discussing cleaning of pre-boiler equipment, W. B. Willsey, assistant chief chemist, Philadelphia Electric Company, has pointed out the fact that the best time to plan for chemical cleaning of the pre-boiler cycle is during the design stage, rather than after the equipment has been constructed.

If the decision to clean this equipment is arrived at in time to incorporate design features and modifications such as necessary valves and connections appropriately located in the system, and such planning as necessary for heating and flushing of all areas to be chemically cleaned, a more complete and effective job will result. Careful preplanning and incorporation of chemical cleaning plans in system design are invaluable aids to performing successful and economical cleaning operations.

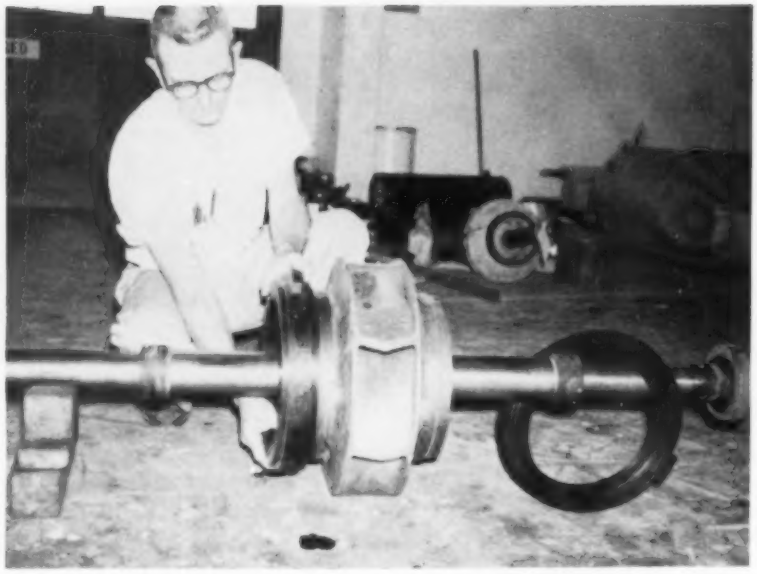
Railroads

Even if some Americans don't think too highly of U. S. railroads, the Russians do. The concepts of the United States have been largely adopted in Russia. Progress in this country is carefully watched by Soviet technicians according to William M. Keller, vice-president, research, Association of American Railroads. His observations were based on a recent inspection trip to the U.S.S.R.

New Soviet freight cars are essentially the same as U.S. models.

(Continued on Page 87)

Plastic Seal Rings for Severe Pumping Service



W. O. SMITH, author of this article, is shown fitting a saran ring to the pump as described in the article.

CHEMICAL PLANT maintenance affords a perfect opportunity for constant search for "serve-all" or "do-all" types of material to combat corrosive materials. The Dow Chemical Company's Texas Division is no exception. Every type of metal, such as stainless steel, monel, nickel and the like, and those alloyed with other metals have their places in the industry as do the various plastics with properties appropriate for service at the temperatures and pressures to which they are subjected.

Here in the Texas Division, the centrifugal pump plays a major part in the transfer of acids, alkalies and salts in solutions. Rings in the centrifugal pump which separate the suction from the discharge are known as seal rings. Abrasive, electrolytic and turbellarian actions account for most maintenance troubles with this equipment.

In an effort to find a substitute material for metal seal rings which were very troublesome and expensive, a high volume, low pressure sea water pump was chosen for experiment with various plastics because of the electrolytic and abrasive action of the material pumped.

Failures of certain plastic rings were attributed to separation of laminations, checks, and cracks.

In due course saran, a polyvinylidene chloride plastic, was chosen for a set of rings. Close tolerance on the impeller caused the first saran rings to fail. A metal seal ring with a six inch bore requires six to eight thousandths tolerance on the impeller. A second set of saran rings was made with ten to twelve thousandths tolerance and put into service.

After sixteen months of continuous operation, the pump was taken out of service to renew the packing sleeve. The saran plastic rings showed absolutely no evidence of wear. Tool marks in the bore left by the machining operation were still evident. This was almost unbelievable because it was in this area that wear was most evident in other types of material used for seal rings.

Centrifugal seawater pumps throughout the Texas Division of The Dow Chemical Company are now equipped with saran seal rings with results meeting all expectations.

Costwise, saran rings are from 30 to 50 per cent less expensive than those made of alloy metals. But the big saving comes from reducing expensive shutdowns and labor loss incurred during pump failures.

Saran is purchased in square laminated blocks. It is sawed into rough rings and then machined to finished sizes. It gives off no offensive odors and holds its shape well when being turned or bored. Shavings come off in long continuous lengths, making clean-up very easy.

Saran is available through The Saran Lined Pipe Company, 2415 Burdette Avenue, Ferndale (Detroit), Michigan, distributor for Saran Fabricated Products produced by The Dow Chemical Company.

By W. O. SMITH, Foreman, Machine Shop, The Dow Chemical Company, Freeport, Texas

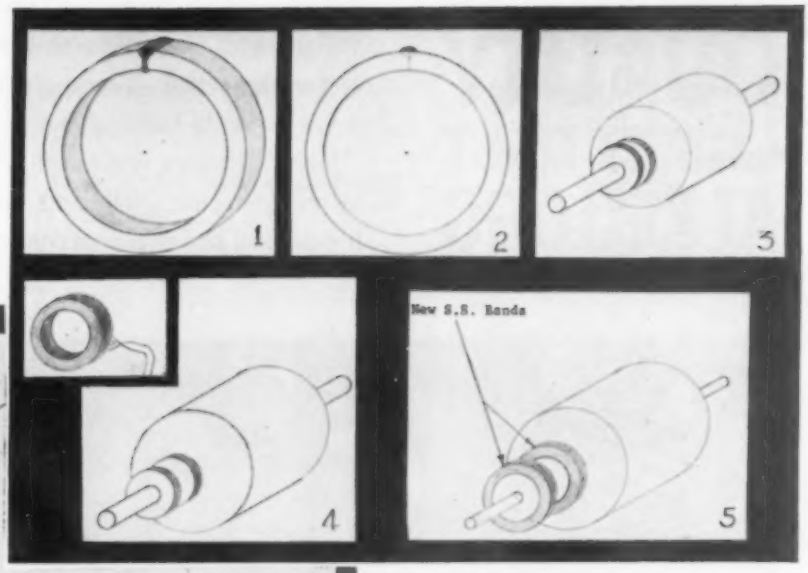
Coming in May SPI

ANNUAL MAINTENANCE ISSUE

An entire issue made up of Case Histories of actual solutions of repair and upkeep problems in Southern and Southwestern plants. Will tell how other engineers handle work that is similar to yours.

Fig. 1. Form circle from No. 304 stainless bar stock. V-groove and weld.

Fig. 2. Normalize and machine inside surface and edges.



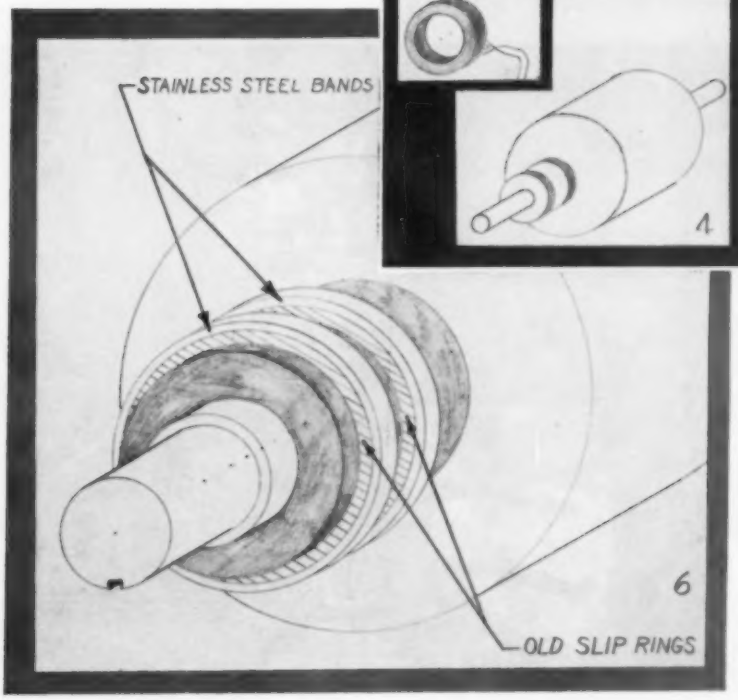


Fig. 3. Turn down old slip rings until .002 to .003 in. oversize for each inch of ring diameter.

Fig. 4. Heat and shrink fit new stainless steel band over old ring.

Fig. 5. Machine outer diameter of new stainless steel bands and polish.

Fig. 6. Sketch of finished job, with new stainless steel bands in place.

Stainless Steel Slip Rings Improve Motors

By FRANK W. ATKINSON
Electrical Engineer

SLIP-RING and brush maintenance can be greatly reduced by facing the old rings with stainless steel bands. No. 304 stainless steel bar stock is used to form the bands.

First the bar is rolled into a circle of approximately the right diameter, then it is V-grooved and welded at the junction. The band is then normalized and its inside surface machined. The old slip ring is turned down to give a shrink fit (.002" to .003" oversize per inch of diameter).

The inside of the band is turned after the circle is formed, because it is impossible to bend a perfectly smooth circle by hand and the weld itself is rough. Therefore, the newly formed band is normalized (heated and let cool) so the weld will be near the same softness as the rest of the band. Then the inner surface can be machined properly.

After the old slip ring is turned down to oversize, the band is heated until it expands enough to slip easily over the old ring. This is the same method used in the old days to place steel bands on wooden wagon wheels. After all bands are installed and become cool, the rotor is placed in a lathe and the outer surfaces of the rings are turned and polished in place.

Better Performance

We at Du Pont's Chattanooga Nylon Plant have found this method very helpful and successful. Some motors improved in this manner have been in 24-hour-a-day service for over five years and the stainless ring bands have not required resurfacing. New motors and alternators can now be bought with stainless steel ring facings.

IN POWER PIPING ERECTION

QUALITY COMES FIRST AT KELLOGG

Field erection by Kellogg of power piping made by Kellogg at its new Williamsport plant assures the highest standards of engineering and workmanship. Quality and strict quality control are reflected in every phase of Kellogg field erection.

Making Kellogg responsible for both manufacture and erection, as many electric utilities do, also can mean marked economies in the over-all power piping contract.

Kellogg's Power Piping Division at Williamsport, Pa., welcomes the opportunity to tell you more about its field erection service and how it can be combined with other Kellogg power piping services to the advantage of the steam-electric and nuclear power generating industry.

POWER PIPING DIVISION / THE M. W. KELLOGG COMPANY

A Subsidiary of Pullman Incorporated

Plant & Headquarters: Williamsport, Pa. Sales Offices: 711 Third Avenue, New York 17, N.Y.

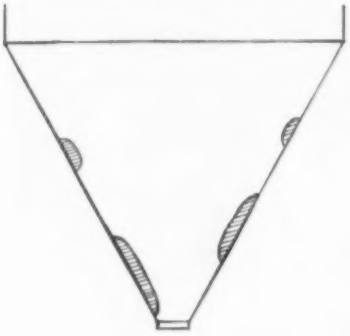
POWER PIPING

KELLOGG

HEADQUARTERS

No More Clogged Hoppers

A RECENT addition to the many industries that have found PneuBin Pulsating Panels can eliminate their hopper-discharge problem is Thomas H. Allen Generating Station at Memphis, Tenn. "Fine coal" is no different than various chemicals, ores, feed ingredients or clays, none of which responds readily to the force of gravity when placed in a hopper.



This installation is particularly interesting in that various other known methods were installed for a trial evaulation period of four months operation. The coal bunkers are now all equipped with PneuBin Pulsating Panels with their assurance of continuous coal flow. The panels are air-inflating and deflating neoprene covered steel plates available in various sizes ranging from 4" x 12" to 36" x 96". Arrangement of the pulsating panels is shown in the sketch.

Some of the improvements incorporated in their design during the past year which greatly increases their effectiveness with the most difficult materials are:

1. Increased amplitude of the 24" wide panels makes them more effective on materials that have a tendency to compact, such as clays.

2. The larger 36" x 96" panel with its 20" amplitude displaces 25 cubic feet of material with each panel inflation. This "under-cutting action" of an eight ton force from each panel inflation, keeps material within the hopper continuously flowing toward and out of the discharge opening.

Factors taken into consideration by the Memphis operating and engineering staff in selecting the equipment were: Assurance of continuous flow of coal, thereby eliminating the possibility of a costly "flame-out" in the boiler fire; and elimination of manual-poking and hammer-blows, and the possibility that an employee may be caught in a slide or collapse, with its possible resultant injury or tragedy.

Safe Handling of Flammable Products

WHILE A GREAT many petroleum products, such as gasoline, jet fuels, kerosene and heating oils, are carried from refinery to market by pipe line, a number of others suitable for pre-packaging are shipped by rail and highway carriers.

For reasons of safety as well as for over-all economy of operation, Continental Oil Company makes extensive use of electric industrial trucks, powered by Edison Nickel-Iron Storage Batteries, at its Ponca City plant to efficiently handle such packaged products as waxes, greases and lubricating oils.

At the wax slabbing plant, for example, where specially designed machinery molds 11-pound slabs of dairy wax at the rate of 37,000 to 40,000 pounds per shift, a low-lift walkie truck, powered by a battery, works continually loading railroad box cars and highway carriers with packaged dairy wax. Shipped to container manufacturers and also to dairies with their own package-making equipment, the hygienically pure wax is used to coat paper containers for milk, cream, butter and other dairy products to make them additionally strong and leakproof.

The grease plant utilizes three 1,000-pound fork-lift trucks, equipped with 30C3 Edison batteries, to handle drums of grease between filling machines, storage areas and the shipping dock. The plant manufactures over 90 different varieties of grease for automotive, industrial and other uses.

Another location where electric industrial trucks are an integral part of daily operations is the compounding and packaging plant. Here, all lubricating oils are manufactured, or more correctly stated, are "compounded" by blending together base oils, additives and other ingredients to formulate various grades and types of lubricating oil products.

Industrial trucks at the compounding and packaging plant are of the 2,000-pound capacity class, powered by 30MC5 Edison batteries. Working principally in the plant's 34,000 square foot warehouse, these fork-lift trucks handle oils in a number of containers, ranging from 55-gallon drums down to packages of individual quart cans. The warehouse, with an unusual sawtooth dock for highway trucks, can accommodate 11 vehicles at a time while a railroad spur along the opposite length of the warehouse accommodates up to 20 box cars. Approximately 800,000 pounds of lubricating oil products are loaded into outgoing carriers by the fork-lift trucks during an average day.

Safety, naturally, is a practiced art at the Ponca City refinery where the storage as well as the continuous processing of tremendous quantities of highly flammable liquids and other materials always presents a source of potential danger. Many departments have established safety records over the years that run into many millions of work-hours without accident. An important contributing factor is the battery-electric truck with its quiet, smooth operation and its freedom from the risk of fire hazards that provides the safe, economical handling of tons of petroleum products daily.

KEEP UP-TO-DATE
USE SPI
READER SERVICE

See Pages 81 & 82

Boiler Evaporation Rates Increased

MANY STEAM PLANT operators in Southern coastal states use low delivered-cost residual fuel oil from South American refineries, shipped in by water transport. One pulp and paper mill in northern Florida uses barges for delivery of Bunker C fuel oil to the plant storage tanks. But the saving in fuel and shipping costs was being chewed up by the misbehavior of this imported oil in the power boilers.

Unfortunately, South American fuels typically contain a high percentage of vanadium, which causes troublesome slagging in addition to cold-end corrosion and fouling.

Following the development pattern of the area, this particular paper mill has been growing rapidly and demanding more steam production with each expansion. The furnace slag was cutting boiler efficiency and reducing steaming capacity.

To get more steam without raising maintenance costs or using more expensive fuel, Nalco 159 has been used for more than a year. Every barge load of Bunker C oil is treated with this oil soluble liquid product by adding the required amount to the storage tank as the fuel is pumped in. No other mixing is needed.

Here is an outline of the combustion system.

Boilers: B & W, Type F, Capacity 60,000 lb hr
Pressure: 450 psig in drum
Temperature: 750 F
Other Equipment: Tubular air heater and superheater
Soot Blowers: Steam, used once every 8-hour shift
Water or Steam Lancing: Not needed
Furnace Cleaning: Not needed
Fuel Consumption: 14,000 gpd per boiler
Fuel Sulfur Content: 2-3%
Fuel Vanadium Content: 200-700 ppm
Fuel Preheating: 220 F at burners
Nalco 159 Feed Rate: All fuel oil treated with 2-3 pints per 1,000 gallons

Before using the Nalco 159, the evaporation rate averaged 88-92 pounds of steam per gallon of fuel. Recent studies showed steam rate had increased up to 98-100 pounds per gallon. Inspection of the furnace revealed *no slag formation* on screen tubes, and superheater section unusually clean.

The capability and equipment life span have been increased. Furnace cleaning and lancing are unnecessary. Higher rates of evaporation have helped to meet the demands of greater paper production, while giving a good return on the investment in Nalco 159.

Car Shaker

THE 5-TON Allis-Chalmers car shaker is providing safe, fast and economical pushbutton unloading of wood chips into a pit at Hudson Pulp & Paper Corporation's Palatka, Florida, mill.

While more coal is unloaded by car shaker than any other material, Hudson Pulp & Paper is having good success in unloading wood chips with it.

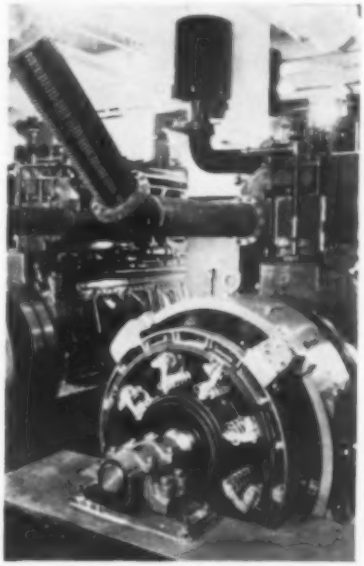
Starting, stopping, raising and lowering of the car shaker is accomplished by one man by means of a pushbutton control. Its simplified two-bearing mechanism provides a vibratory motion which shakes the railroad car to loosen the chips so that they flow freely through bottom openings without requiring workmen to enter the car.

Flexible Hose Takes the Jitters Out

VIBRATION posed a troublesome problem in the power generating station of a Southern chemical plant, whenever diesel generators were started up. Piping shook so severely that anchors were pulled loose from the sheet metal bulkheads, parting the bulkhead panels at the seams. In addition, exhaust mufflers on the roof vibrated alarmingly until the generators were phased in.

Stainless steel vibration isolators, designed especially for diesel exhaust lines, were installed between the diesel engine and the exhaust line. These "21-X Vibratamers," made by Allied Metal Hose Company, have a nominal diameter of 10 in. to match the diesel's exhaust pipe, and in a length of 35 in. absorb vibration of up to ⅝ in. lateral and ½ in. axial total amplitude.

As a result vibration has been greatly reduced, damage to plant roofing and bulkheads is avoided, and plant noise level during start-up has been lowered. Also, reducing stress on piping connections means less maintenance time in checking and tightening connections periodically.



NEW Product Briefs

. . . there is always a BETTER WAY

FOR MORE INFORMATION ON FOLLOWING ITEMS

Fill in Code Number on Return Card — Page 81

Potentiometer

C-1 A new industrial process potentiometer has been introduced by **Brown Instruments Division of Minneapolis-Honeywell Regulator Company,** Wayne & Windrim Aves., Philadelphia 44, Pa.

The new device is called the ElectroniK 17 and incorporates an extremely accurate, trouble-free electro-mechanical strain gage as the rebalancing element. In eliminating the conventional slidewire, infinite resolution is claimed for the first time in a potentiometer. No longer is the number of points at which a potentiometer can come to balance limited to the turns on a slidewire.

Initial production of the new potentiometer, which can be mounted in a standard 19-inch relay rack, on a panel or bench, or made portable, consists of a single pen strip and circular chart recorders and a circular scale indicator, each with or without control. These are available on an 8-week delivery basis.

As the "heart" of the ElectroniK 17, the Stranducer varies the output potential of the measuring circuit to balance the input signal from the process variable.

Four prestressed looped wire strands enclosed in an I-shape frame form the variable resistance legs of the measuring circuit. Their resistance varies in proportion to the tension applied to them.

At zero position, the wires, fastened to the pivot arm of the Stranducer, are in equal tension and are of equal resistance. The pivot arm, as it rocks back and forth, increases tension on two of the wires and decreases it on the other two wires. It is linked mechanically through sector and strap reduction stages and the drive cable to the balancing motor.

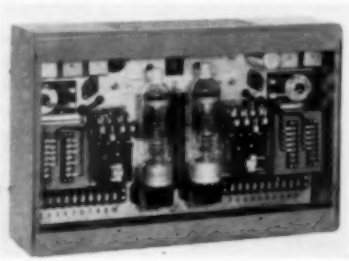
Shatterproof Bowls

C-2 **C. A. Norgren Co.,** Englewood, Colo., has announced new unbreakable bowls for its air line filters and lubricators.

The bowls are fully transparent, yet are so tough they will not break or shatter. In addition, they offer superior resistance to solvents, oils, and corrosive gases.

Adjustable Speed Drives

C-3 **Cleveland Machine Controls, Inc.,** 1155 Brookpark Road, Cleveland 9, Ohio, has added two sizes to its line of Series 25 electronic adjustable speed drives. Size 3 drives are rated at 3 hp



maximum and Size 4 at 7½ hp maximum. Sizes 1 and 2 previously offered, covered ratings to ¾ hp.

The drives consist of d-c motors powered by two thyratrons in a full wave circuit. Speed ranges up to 100:1 are attainable. By controlling the thyratron tubes with a magnetic amplifier these drives will hold rpm within 2 or 3% of set speed under widely varying loads, and drift with time is only one or two tenths of a per cent of set speed after warmup. Even from a cold start drift does not exceed 2%. Size 3 and 4 drives include reversing and dynamic braking.

Red Infrared Lamp

C-4 A new type infrared heat lamp containing a special red filter to eliminate unwanted light has been developed by **Westinghouse Lamp Division,** Bloomfield, N. J. The lamp is expected to have important applications for which present type T3 quartz heat lamps are not suited.

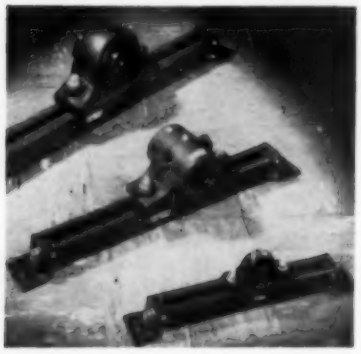
Quartz heat lamps provide a great amount of light as well as intense

heat. This light is objectionable in many applications such as food warming and cooking devices, industrial baking and drying operations where employees are exposed to the light, and in many other instances where only the heat is desired. The new lamp provides the heat but permits less than one per cent of the light to shine through.

The lamps provide thousands of degrees of temperature almost instantaneously, yet are so resistant to thermal shock that ice water can be poured over a red hot lamp without danger of cracking. They can be used in military testing to simulate the sudden temperature changes encountered by missiles or in industry for a myriad of drying, baking and dehydrating applications.

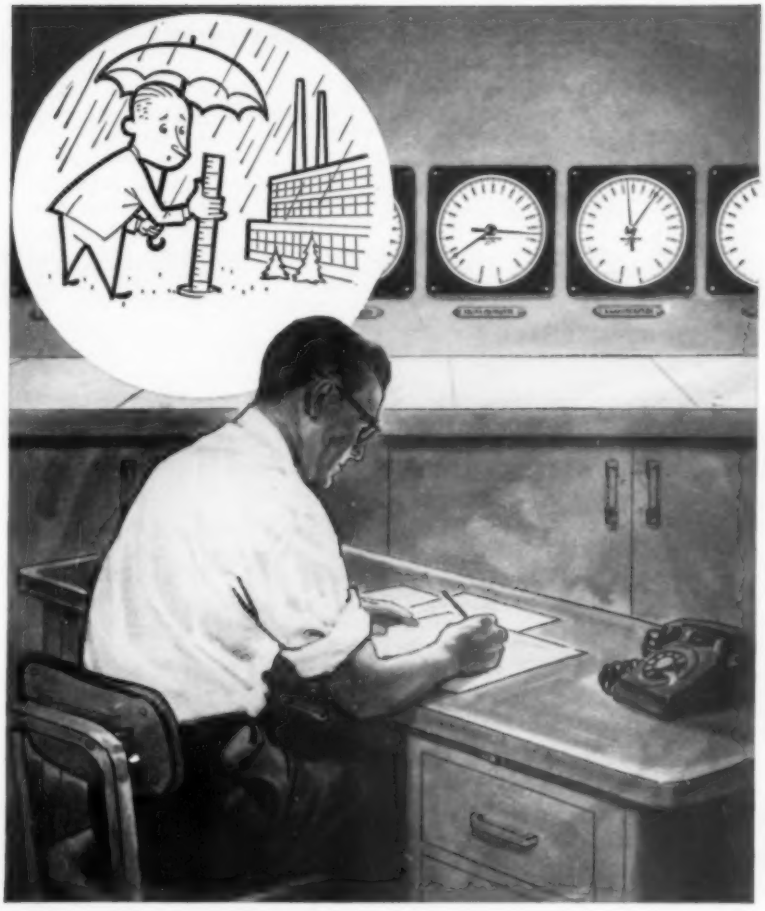
Multi-Bearing Takeup Frames

C-5 **Link-Belt Company,** Prudential Plaza, Chicago 1, Ill., has introduced new Multi-Bearing takeup frames, available from stock in 11 sizes. They are especially designed to accommo-



date any type of bearing — babbitted, bronze, ball or roller — in any two-bolt pillow block with mounting holes up to ⅝ in.

The new frames allow horizontal bearing adjustments from 6 to 24 in. and will mount 143 different bearing shaft sizes from ⅝ to 2-7/16 in. diameter. Mounting pads are easily adjusted to the mounting holes in the pillow block. One pad is moved by an adjusting screw, while the other pad slides freely to the proper distance between the pillow block mounting holes. This mounting flexibility permits each size of takeup frame to accept a wide range of pillow block bore sizes. Mounting bolts are zinc plated and washers and nuts for mounting the pillow block are furnished with each frame.



Take the legwork out of liquid measurement

Here's practical liquid measuring—the modern way... without roaming all over the lot! Liquidometer Gauges let you inventory distantly stored liquids at a glance.

Completely automatic Liquidometer Gauges can be located as far as 250 feet from tanks. Think what this centralized system can mean in man-hours saved—let alone the additional safety of personnel who no longer have to trudge to, or tamper with, hard-to-get-at tanks.

Simple to install, and requiring no maintenance, Liquidometer Gauges measure virtually all liquids conveniently, continuously, and correctly. There's a type available for practically every liquid measuring application.

For complete details, write

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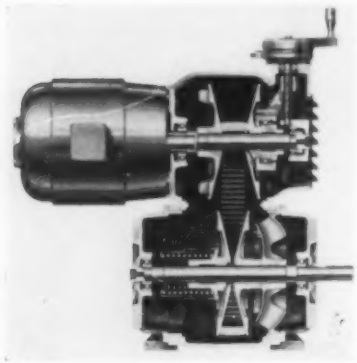
THE LIQUIDOMETER CORP.

Dept. F, LONG ISLAND CITY 1, NEW YORK

New Product Briefs (Continued)

Variable Speed Drives

C-6 The Industrial Products Division of **Western Gear Corporation,** Lynwood, Calif., announces the design and manufacture of a complete line of mechanical variable speed drives under the trade name "Vari-Master."

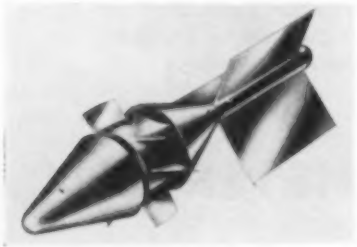


The Vari-Master is available in three sizes, covering the range of from 1 to 10 hp with a wide speed range of up to 8 to 1 ratio of speed variation. It is offered in both drip proof and totally enclosed construction. A standard, NEMA 'C' face motor, with standard shaft extension is utilized. The motor can be of drip proof, totally enclosed or explosion proof design.

The Vari-Master uses a fan on the variable speed shaft to allow maximum cooling of the belt and longer belt life. Discs are positively positioned by shaft shoulders, thus there is no possibility of belt misalignment.

Turbine Flow Transducer

C-7 A new turbine type flow transducer has been developed by **Francisco Engineering Company,** 23987 Ventura Boulevard, Calabasas, Calif. More accuracy, more reliability, and longer life are possible because a unique design permits constant hydrodynamic balance of the rotor without the use of thrust bearings.



The speed at which the rotor turns is directly proportional to the volumetric flow rate and the number of times it rotates is proportional to the total volume of fluid that has passed through the transducer. In close proximity to the rotor blade tips, but mounted externally, is a variable reluctance pick-up. As each blade tip passes the pick-up, an electrical impulse is produced. Thus, the rate of flow is proportional to the pulse frequency; the total volume of flow is proportional to the total number of impulses.

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Corrosion Control for Cooling Water Systems

C-8 A recent development for effectively controlling corrosion in recirculating cooling water systems is announced by **Nalco Chemical Company,** 6216 West 66th Place, Chicago 38, Ill.

The new concept is based on a method for initial preparation and protection of metal surfaces of new or freshly acidized cooling water equipment. The preparation consists of removal of materials that interfere with corrosion inhibitor film formation such as oils, greases, and rust. Surfaces are then kept in an active state at which time a complete, tough protective film is established. The equipment will be maintained in this state with the usually employed corrosion inhibitors during normal operation.

The chemical that accomplishes this important initial step is known as Nalprep, and is said to do three vital jobs at the same time. First, it removes organic and inorganic materials and deposits from metal surfaces. Second, it prevents the clean, activated metal from reacting with anything but the filming inhibitor present in the Nalprep material. Third, it provides the initial protective film of corrosion inhibitor over the entire metal surface.

Centrifugal Fans

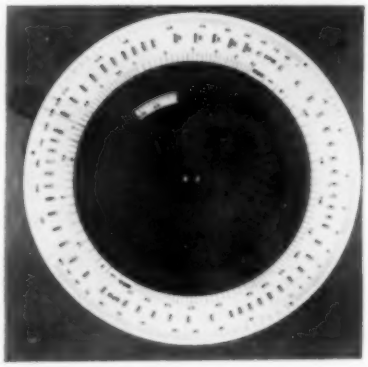
C-9 A new series of airfoil centrifugal fans for industrial processing and other applications has been introduced by **Chicago Blower Corporation,** 9867 Pacific Ave., Franklin Park, Ill.

The new design catalogs static pressures of ¼ to 30 inches in volumes ranging from 440 cfm to 560,000 cfm and temperatures up to 800 F. The fans are engineered to operate at low horsepower requirements, permitting the use of smaller motors. Hollow airfoil shaped blades provide 20% to 40% quieter operation, and increase efficiencies.

These "Design 10" fans come in sizes 12¼ to 89 and in five classes of construction.

Hydraulic Calculator

C-10 **Robert E. Martin, Consulting Engineer,** 5402 Preston Hwy., Louisville 13, Ky., has developed a hydraulic circular slide rule for calculations based on the Williams and Hazen formula. It



can be used for determining head loss, flow, velocity, size of pipe and the differential of the head loss, 1.85 h/Q, a factor used in the solution of Hardy Cross problems.

Accurate, rapid results can be obtained from the calculator with a minimum of practice. It will be found that the calculator gives at once values and conditions not shown in the various pipe tables. Total friction loss for pipe lines of any length, from 100 ft to 20,000 ft, may be obtained direct without the necessity of finding the slope per 1,000 ft.

Several values of C are shown for pipes 4" to 42" in diameter. Single C values are shown for pipes up to 72" diameter with a conversion chart for any other C value. Other advantages of the calculator will become apparent with the solution

of typical water works problems.

The hydraulic calculator consists of three parts: a movable indicator arm, an interscale disc, and an outer-scale disc. Total head losses (or slope per 1,000 ft) from 0.06 ft to 250 ft are shown. Discharge is given in both mgd and gpm. The calculator is made of vinyl and is 6 inches in diameter. Price is $6.00 and delivery is immediate.

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Plastic Compound

C-11 A highly corrosion-resistant new plastic compound, capable of sustaining continuous operation temperatures to 300 F, has been developed by Beetle Plastics of **Crompton & Knowles Corp.**, Fall River, Mass.

Bonate CF-9070 is a compound of modified furfural alcohol reinforced with glass fibers. It has proved successful in the processing of tanks, pipe and ducting. It is non-flammable and is resistant to practically all acids and solvents, alkalies, and hot, concentrated sodium and potassium hydroxide.

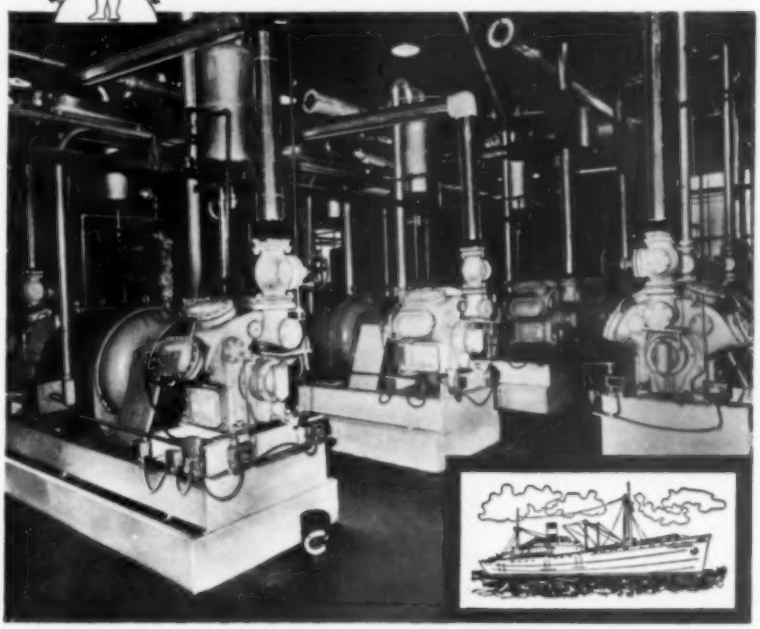
Basket Strainers

C-12 Four low-cost basket strainers for protecting pumps, valves and regulators have been added to the line manufactured by **Strong, Division of White Sewing Machine Corp.**, 509 Sandusky St., Conneaut, Ohio.

Clamped covers are provided for

Breakfast orange juice fresh from Florida, thanks to Vilter

Tropicana Products—world's largest producer of chilled citrus and fruit juices.



View of Vilter VMC compressors installed in the Tropicana Products Plant at Port Canaveral, Florida. Inset shows the S.S. Tropicana which carries 1,500,000 gallons of chilled orange juice every eight days between Port Canaveral and New York.

The high consumer acceptance of Tropicana's orange juice is the result of a special processing and storing method. This makes possible the year-'round delivery of chilled full-flavored, vitamin-rich, orange juice over Tropicana's entire marketing area.

One key to their success is the reliable refrigeration supplied by Vilter for cooling and processing fresh juices at their various plants. Vilter equipment, at Port Canaveral, for instance, includes 16 VMC compressors, and Vilter ammonia liquid intercoolers and ethylene glycol chillers. The entire Vilter refrigeration system functions smoothly and efficiently to handle Tropicana's large daily requirements of many thousands of gallons. Refrigerated storage facilities hold 3,000,000 gallons at Port Canaveral.

The dependable operation and efficient performance of Vilter VMC compressors is the result of continuing engineering improvements: protection against refrigerant slugs, built-in capacity reduction, precision manufacturing and factory-run-in tests.

For help with your refrigeration problem, why not call on your nearest Vilter Distributor?

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Write for Bulletin 817 to The Vilter Manufacturing Company, Dept. SP-901 2217 South First Street Milwaukee 7, Wisconsin

most applications and facilitate strainer cleaning. Bolted covers are supplied for applications subjected to pressures up to 600 psi at 800 F. Sizes range from 2" to 16".

The new strainers supplement the current line of Strong steam specialties and fluid controls that includes numerous types of steam traps, strainers, separators, pressure regulators and valves.

Recording Controller

C-13 A new recording type pressure and temperature controller for industrial processes is offered by **Stickle Steam Specialties Co.**, 2215 Valley Ave., Indianapolis 18, Ind.

The instrument maintains any desired pressure or temperature by regulating the flow of steam or liquid through a diaphragm motor valve. Accuracy is said to be plus or minus 1% of total span.

Operating the controller is a sensitive air measuring system actuated by a process temperature or pressure measuring system. The air measuring system operates a high output pneumatic relay to control a 3 to 15 psi air output.

Motor Starters

C-14 **The Clark Controller Company**, 1146 E. 152nd St., Cleveland 10, Ohio, has introduced the new Type CY Size 00 starter and contactor for non-reversing, full voltage starting of 1/6 to 2 hp squirrel cage motors. The same unit can be used on either single-phase or three-phase motors operating on 110 to 600 volt power, and 25- to 60-cycle frequencies. Starters are equipped with melting-alloy, thermal-overload relays. On single phase, only one overload is required.

Available as open type or in NEMA Type 1, general purpose enclosures are for separate push button operation; with "Hand-Off-Automatic" selector switch; or with "Start-Stop" push button.

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Conveyor Belt

C-15 A conveyor belt developed for superior resistance to heavy impact, accidental damage and mildew is announced by **B. F. Goodrich Industrial Products Company**, a division of The B. F. Goodrich Company, Akron, Ohio.

The unique construction, proved in several years of operating experience on underground coal handling systems, is offered for the first time for use on general industrial and overland conveyor systems.

Known as "Nylock," it features a solid woven body impregnated with rubber and encased with rubber covers. There are no plies of fabric to separate under impact and the woven body has three times the tear resistance of equivalent strength nylon-filled multiple-ply belt. The new design is recommended for general industrial use where belt training is difficult, leading to edge damage in conventional belts.

Sealant for Oil Leaks

C-16 A positive sealant, called "Oyltite-Stik," for emergency sealing of transformer oil leaks through cracks or pinholes in welds or joints is now offered by the **Westinghouse Electric Corporation**, Pittsburgh 30, Pa.

On rare occasions, oil-immersed transformers may develop small oil seepage leaks which necessitates removal of the transformer from service. This new sealant can repair many of these leaks while the transformer is still in service, thereby eliminating costly service interruptions.

The "Oyltite-Stik" sealant will stop leaks even while the oil is seeping through cracks or splits. It is not affected by temperature changes and it remains plastic and expands and contracts with the part repaired.

The stick comes in a cylindrical form approximately ½ inch in diameter and four inches in length. It is similar to a stiff putty, and it is only necessary to rub it over the leak several times in order to force the material into the leak.

Metal Cutting Saw

C-17 **Skil Corporation**, 5033 Elston Ave., Chicago 30, Ill., announces a new Recipro Saw to cut all metals, including stainless steel. In addition to the

metal cutting saw, the company offers an improved version of its 2-speed, all-purpose Model 700. According to Skil, this combination of two reciprocating saws will cut virtually any material.

The new tool has two speeds, 1,000 and 1,400 strokes-per-minute, for cutting different gauges and densities of metal. The low speed is for stainless steel, other hard alloys, cast iron, any hard abrasive material. The high speed is recommended for cutting mild steel and non-ferrous metals.

Sequence Controller

C-18 **Cleveland Controls, Inc.**, 1111 Brookpark Road, Cleveland 9, Ohio, is offering the Master Monitor for sequence control of multiple boiler installations. The complete modulating and sequence control system is available in a single compact enclosure, for automatically operating a bank of boilers, compressors or other units,

so that only the required number are called on to meet the load demand.

The monitor cuts individual units in and out of operation in response to pre-determined pressure or temperature variations — or to any other signal. This compact, pre-wired, package control system can be applied to existing installations as well imum of field wiring and set-up as to new construction, with a mintime.

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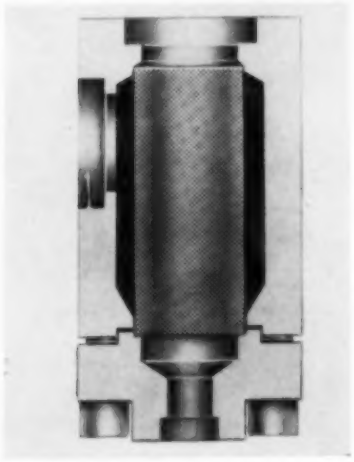
Improved Strainers

C-19 A revised and expanded line of "Y" strainers and a block steel angle strainer have been introduced by the **McAlear Manufacturing Co.** 1901 South Western Ave., Chicago 9, Ill.



The new strainers are heavier in design than comparable previous models, yet are available at lower cost.

Nos. 530 and 530-G "Y" strainers are suitable for all steam, water, air, oil, or gas applications. They are designed to protect traps, regulators, meters and other equipment from dirt, scale, pipe cuttings and other foreign material.

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10—Floor Maintenance — Catalogs show how to maintain floors faster for less money with Lincoln-Wilshire automatic scrubbers, power sweepers and polishers. — AMERICAN-LINCOLN CORP.

24—Roof Maintenance — 4-page Catalog 5D describes Dri-N-Tite products for patching, priming and coating composition, corrugated or sheet metal, slag, gravel, concrete and felt roofs.—A. C. HORN COMPANIES.

27—Corrosion Control Systems—Brochure 9111 outlines five-step procedure for primary protection and preventive maintenance of all metal surfaces subject to acids, alkalies, solvents, fumes and gases. — TRUSCON LABORATORIES.

35—Stop Corrosion—4 page bulletin tells how Alkasteem neutralizes carbon dioxide and Ox-Gem reacts with oxygen to stop corrosion in boilers, heaters, condensate returns, steam lines and traps. — ANDERSON CHEMICAL COMPANY, INC.

37—Maintenance Gun — Brochure describes the Von Arx Air Gun —lightweight tool for tough cleaning, de-scaling and de-rusting jobs. Air operated reciprocating needles adjust to contours automatically. Three sizes. Comes in handy kit with accessories. — MARINDUS COMPANY.

58—Tube Expander Drives — Bulletin 581 gives data on complete line of Torq-Air-Matic automatic tube expander drives and explains the importance of precision control in tube expanding. Chart to aid selecting right model for the right job. — THOMAS C. WILSON, INC.

77—Plant Health Aid — Automatic footsprayer dispenses skin-toughening solution for prevention of athlete's foot. One gal of solution sufficient for 3,000 treatments. Catalog S-12 gives details. — ONOX, INC.

FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

100—Power Plant Pumps—Bulletin BJP 58-8 covers complete line of standard pumps for power plant requirements — from 12,000 hp, double case boiler feed pump, to condensate, circulating and booster pumping duty. Also, special pumps for nuclear power plant installation. —BYRON JACKSON PUMPS, INC.

105—Heat Exchanger—Heat recovery is dollar recovery. By capturing ordinarily wasted heat and putting it to useful work, modern heat exchangers have proven a great source of plant economy. New 12-page bulletin describes the Fin-Pak, an efficient lightweight heat exchanger for gas turbine and diesel and gas engine cycles, chemical and food processing, steam air heating, etc. — THE AIR PREHEATER CORPORATION.

135—Air Cooled Heat Exchanger—Bulletin 132 describes air-cooled unit solving the problem of water supply and disposal, cooling fluids or condensing vapors, removing heat at rate of input for close control of temperature. All parts of unit always accessible for easy maintenance with cleanable coils. Replaces both cooling tower and surface condenser. —NIAGARA BLOWER COMPANY.

143—Chemical Feeders — 36 page Bul. 1136 describes metering pumps — types, construction, displacement and operating pressures. Gives handling recommendations for chemicals, acids, etc., and volumetric conversion tables.—MANZEL.

165—Heat Exchangers—Bulletin 120 illustrates function of new equipment to provide cooling of liquids in industrial plants. Air-cooled heat exchanger, which is independent of large supply of cooling water, provides additional savings of installation and operation expense.—NIAGARA BLOWER COMPANY.

INSTRUMENTS—METERS CONTROLS—REGULATORS

205—Draft Gages — Bulletins describe inclined, vertical tube, air filter gages, straight line and dial pointer type, minified draft and receiver type gages, velocity gages and pitot tubes, gas analyzers and steam calorimeters. — ELLISON DRAFT GAGE CO.

207—Control Centers & Systems—Combustion safeguard and automation packaged control centers insure full coordination of complete system, place responsibility on one source, insure correct wiring, and reduce field labor. Catalog C11 illustrates variety of designs and circuits now in use. — WEBSTER ENGINEERING CO.

208—Water Level Alarms—Brochure D1 — Float operated low and high water level alarms and fuel cut-offs, for low and medium pressure boilers, tanks and other vessels. — RELIANCE GAUGE COLUMN CO.

211—Butterfly Valves — Folder supplement to Catalog 307 stresses flexibility in valve line for controlling large volumes of liquids or gases. Valve actuators, special arrangements, shaft extensions, and electric actuators and positioners are featured—MASON-NEILAN.

212—Self-Powered Controls — Bulletin 620 describes self-powered automatic temperature regulators — no compressed air or electrical wiring required, no delicate mechanisms to adjust, no packing glands to stick, no shut-down due to power failure.—SARCO COMPANY, INC.

224—Feedwater Regulator—Bulletin 1044 describes the BI Feedwater Regulator, the single-element unit employing thermostatic-tube level controller which actuates a regulating valve in feed line. For loads from 10 to 785 psig. Includes specifications table and schematic diagram. — COPES-VULCAN DIV.

225 — Temperature Regulators — "Sliding Gate" units are simple, low cost, self-operating, automatic control valves for heating or cooling applications. Action easily reversed by rotating seats 180°; self-powered — no electricity or compressed air needed; easy to install. Bulletin J-180-1 describes ten standard ranges from 35-450 F. — OPW-JORDAN.

235—Liquid Level Gauges — Bulletin 463A describes automatic remote reading systems for nearly any liquid. Features include easy to read dial indication — LIQUIDOMETER CORP.

267—Remote Liquid Level Indicators—Bulletin RI-1825 describes indicators for pressures up to 3000 psi—advantages, operation and specific installations. — YARNALL-WARING COMPANY.

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PLANT CONSTRUCTION—WELDING EQUIPMENT—SPECIALTIES

300—Buyer's Guide—Up-to-date industrial and maintenance building products stock list. Includes complete listing of all Rasco distributed products plus branch locations. —REYNOLDS ALUMINUM SUPPLY CO.

304—Backing Rings — Bulletin 56-2 describes rings for fast, economical fit-up in piping, tubing, fittings and valves. Shows how rings assure uniform complete-penetration welds and ease of handling in shop and field. Carbon steel, wrought iron, chrome alloys, stainless, aluminum and copper.—ROBVON BACKING RING COMPANY.

306—Steel Buildings — Shed roof, gable roof frameless and gable roof rigid frame units described in Catalog SX-13757. 5,000 sizes available to meet all space needs.—ARMCO DRAINAGE & METAL PRODUCTS, INC.

309—Fiberglass Panels having 20-year guarantee on panel color and light transmission characteristics are lowest-cost glazing you can buy on cost-per-year basis. Stylux-20 is shatterproof; provides up to 90% light transmission; does not pit or erode. Use for windows, skylights, sun shades, etc.—BUTLER MANUFACTURING COMPANY.

321—Storage Hot Water Tanks — Tanks to 6,570 gal and heating elements to 33,000 gpm covered in Catalog BH-2N. Includes dimensions, pressures, weights and prices. Three methods of protective linings are described and priced.—THE SIMS CO.

324—Painting New Plants — "Plan Painting of New Plants to Reduce Costs" describes how lead-suboxide paints can save 1 or 2 coats of paint on new plants. Eventual repainting costs are cut as well since these paints form a dense, metallic lead film which can be recoated without expensive scraping, sanding or repriming.—SUBOX INC.

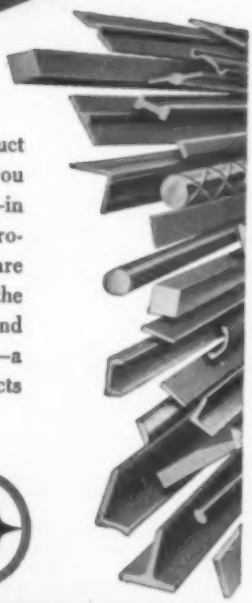
325—Water Storage — The Cylindroid, a functional design for large-volume, low-cost, ground-level water storage described in 4-page catalog. Light steel construction, and smaller field erection crew are among savings over standard ground-level tanks. — GRAVER TANK & MFG. CO.

365—Storage Water Heaters — Gas-fired, Scalefree 230 units described in Bulletin 4. Fully automatic package requires only simple connections. Available in more than 100 storage and recovery combinations. Storage capacities range from 250-4,000 gal.—THE PATTERSON-KELLEY CO.

370—Industrial Fence — You can eliminate pilferage, control traffic, and improve plant appearance most economically with Anchor Chain Link Fences. Catalog gives case studies from other plants in South - Southwest. — ANCHOR FENCE.

WHERE THE QUALITY BEGINS IN

DIXISTEEL® ROLLED PRODUCTS



Steel is no different than any other product in this respect: to obtain top quality, you must start with the best raw materials—in our case the molten steel, which will be processed into the product you buy. Extra care is taken in making each heat to assure the finest quality bars, shapes, angles, flats, and others which bear the name DIXISTEEL—a hallmark that is your assurance of products that will fully meet your requirements.

MAKERS OF DIXISTEEL® SINCE 1901

Steel

Atlantic Steel Company

P. O. Box 1714, ATLANTA 1, GEORGIA—TRinity 5-3441

Bulletins (Cont.)

386—Rigid Frame Buildings—8-page bulletin "Dixisteel Rigid Frame Buildings" — low cost, flexibility of design, durability, and minimum maintenance; also triangular or bowstring truss all-steel roof systems; fabricated for rapid erection. — ATLANTIC STEEL COMPANY.

390—Tank Insulation — An uninsulated tank is like a giant radiator heating the outdoors — and that costs money. 8-page Ultralite Tank Brochure tells you how you can save over 90% of this heat loss with glass fiber blankets. Can pay for itself in six months to a year.—GUSTIN-BACON.

PIPING—VALVES—FITTINGS STEAM SPECIALTIES—TRAPS

403—Valve Operators—Folder shows how re-designed sprocket rim makes any valve readily accessible from the floor. Simplifies pipe layouts, prevents accidents, fits all valve wheels. — BABBITT STEAM SPECIALTY CO.

409—Lubricated Plug Valves—Catalog PV-4 covers operational features. Quarter-turn to open or close; lubricant grooves provide positive seal when valve is closed; when open, seating surfaces not exposed. —THE WM. POWELL COMPANY.

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See Pages 81 & 82

410—Flexible Connectors—How all-metal connectors absorb piping vibration described in Catalog 1D-100C. Convey corrosives, simplify misaligned hookups, and save installation time. Bronze, carbon steel and stainless steel.—UNIVERSAL METAL HOSE CO.

411—Steam Trap Book — 48 page manual reviews importance of good trapping. Gives complete data on traps and strainers. Contains complete selection, installation, testing and maintenance information. Many useful tables and charts. — ARMSTRONG MACHINE WORKS.

414—Acid Resistant Pipe — 4 page technical brochure covers properties of Union 20-S stainless steel. Alloy can be welded and put into service without subsequent annealing. Shows comparative resistance to 94 different corrosive agents.—REYNOLDS ALUMINUM SUPPLY CO. —UNION STEEL CORP.

422—Welded Steel Pipe — 40 page catalog describes applications, advantages, standard specifications, production limits, linings and coating, fittings, joints, of welded steel pipe. Data tables, drawings, and illustrations included. — ARMCO DRAINAGE & METAL PRODUCTS, INC.

429—Expansion Joints—Advantages of the Gun-Pakt expansion joint described in Bulletin EJ-1917. No shutdowns for repacking. Installational suggestions. — YARNALL-WARING COMPANY.

452—Pipe and Tubes—42 page Bulletin 26 gives types of steel tubes, tensile, creep and rupture properties, welding and forming data, applications and other valuable information. — National Tube Div., UNITED STATES STEEL CORP.

463—Stainless Steel Valves — Catalog 59 SS describes line of gate, globe and swing check valves with details of valve patterns in alloys that satisfy requirements of most corrosive services. Includes section to show degree of resistance of alloys to many corrosive media under varying conditions.—JENKINS BROS.

468—Steam Traps — 40 page engineering manual aids engineers and maintenance men in sizing, specifying and buying of steam traps and other fluid specialties. All data necessary to engineer a trap installation is included.—V. D. ANDERSON CO.

488—Power Piping Field Erection — Increased importance of piping erection proficiency is stressed in new 12-page brochure. Tells how field erection costs and quality are controlled and discusses welding and other technical aspects.—THE M. W. KELLOGG COMPANY.

493—Unions & Swing Check Valves — Engineering data, sizes, weights and dimensions on Perfect Seal Pipe Unions and Swing Check Valves featured in 20-p Cat. 60. Also includes Gasketless Cup-Orifice Unions and Ductile Iron Check Valves. — CATAWISSA VALVE & FITTINGS CO.

BOILERS—STOKERS TURBINES—BURNERS

502—Feedwater Treatment — 4 page catalog tells how Braxon and Flako internally condition water to remove and prevent scale formation and corrosion in boilers.—ANDERSON CHEMICAL COMPANY.

507—Packaged Water Tube Boilers— Descriptive catalogs detail 10 outstanding features including six-wall furnace cooling, insulated double-steel casing, manway in every drumhead, and tangent tubing providing "solid walls of water" on four sides of furnace. — SPRINGFIELD BOILER COMPANY.

516—Fuel Savings — How the packaged Ljungstrom air preheater boosts performance and offers fuel savings for small boilers and process applications is highlighted in 14-page bulletin. Boilers as small as 25,000 lb/hr can have advantages of regenerative preheating — saves fuel, boosts output, and permits use of lower grade fuels.—THE AIR PREHEATER CORPORATION.

523—Soot Blowers — Design and operating features of three dependable boiler cleaning units covered in Bulletin 1067 (air-powered D-4-A), Bulletin 1071 (manually operated D-4), and Bulletin 1072 (electric D-4-E). Simple three-step procedure for removing soot blower head and element from boiler is illustrated. — COPES-VULCAN DIVISION.

536—Automatic Boiler-Burner Unit —Assembled plant (Scotch-type, two-pass) for all heat or power applications, low pressure or high pressure; burner to match for heavy oil, light oil, or combinations of gas/light or gas/heavy oil. Easy maintenance. Bulletin SPI-100 gives details.—INDUSTRIAL COMBUSTION, INC.

563—Burn Refuse Fuels — Bulletin 510 describes and illustrates Spreader Stokers for utilizing many refuse and by-product waste materials as fuel to produce steam for process, power or heating. — DETROIT STOKER COMPANY.

590—Packaged Rotary Burner—Fully automatic Roto-Pack forced draft units described in bulletin: 6 sizes, 7 types to fit all automatically fired boilers or furnaces. Burn all grades of fuel oils, gaseous fuels or combination of both.—TODD SHIPYARDS CORPORATION.

594 — Packaged Boiler — Ten outstanding features of new positive flow model in 5 sizes (50-100 hp) include ease of operation and accessibility. Bulletin 1275 gives engineering details. Oil-gas and combination fired. New burner design.—ORR & SEMBOWER.

ENGINES—DRIVES POWER TRANSMISSION MATERIAL HANDLING

600—Mechanical Shaft Seals—Chempro mechanical external seal described in Bulletin CP-551. First seal designed for complete interchangeability with packing. No mounting clamps, machinery stuffing box faces or drilling holes. Install in 30 min. Adjust after installation.—CHEMICAL & POWER PRODUCTS, INC.

605—Cranes & Hoists — Production moves faster, more efficiently and you increase usable storage space with Job-Mated cranes and hoists. Bulletin gives you the right combination of capacity, clearance, speed, controls and components to handle each job best. — SHEPARD NILES CRANE AND HOIST CORPORATION.

614—Vertical Transportation—Catalog A-382 describes and illustrates details of passenger and freight elevators and escalators, for use in all types of industrial plants. —OTIS ELEVATOR CO.

616—Gas Fork Trucks — Extremely maneuverable, easy-to-operate trucks described in catalog. Standard full capacity lifts up to 144"—higher lifts available. Pneumatic-tire mod-

els for rugged indoor-outdoor work. — BAKER INDUSTRIAL TRUCKS DIV.

635—Bearings & Bars — Pocket size edition 158 gives complete list of cast bronze and sintered bronze bearings and bars. Bearing aluminum bar data included.—THE BUNTING BRASS AND BRONZE COMPANY.

641—Belt Conveyors — Cat. ID-591, 88 pages, shows principal belt conveyor products, including heavy duty and standard roller bearing and precision ball bearing idlers. Engineering data section contains simplified and condensed information for proper selection. — CONTINENTAL CONVEYOR & EQUIPMENT CO.

WATER TREATMENT—HEATING & AIR CONDITIONING—DUST & FUME CONTROL—REFRIGERATION

700—Peak Load Problems? — Keep your air conditioning and refrigeration systems operating at maximum efficiency during peak load months. Catalog tells how Anco treatment removes rust and scale and kills slime and algae in equipment. — ANDERSON CHEMICAL COMPANY.

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703—Industrial Air Conditioner — Bulletin 122 describes methods to obtain control of air properties with accuracy of 1% in R.H. and 1 F in temperature (up to 140 F dew point) with compact high capacity apparatus. Entirely independent of the use of moisture-sensitive instruments.—NIAGARA BLOWER COMPANY.

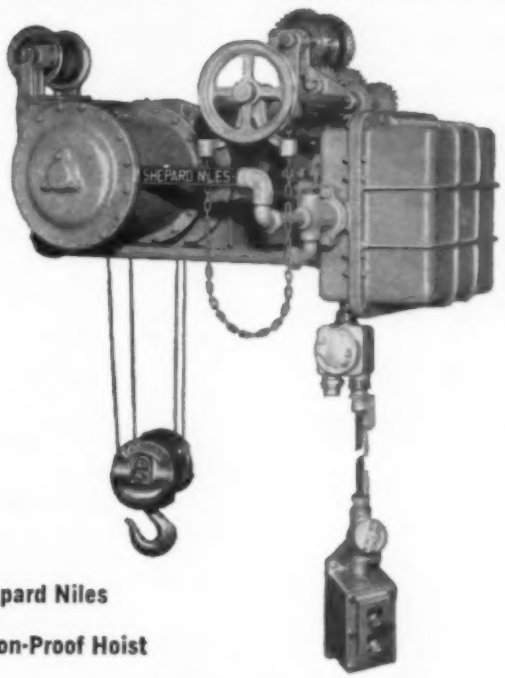
709—Purer Process Water — Data tells how Ferri-Floc (ferric sulfate) can help you with coagulation and softening, removal of iron and manganese and other water purification problems.—TENNESSEE CORPORATION.

724—Chemicals & Services — Water treatment chemicals, and engineering services for the Industrial South-Southwest highlighted in 12-page Bulletin 5000-A. Specific products and their functions detailed. — DEARBORN CHEMICAL COMPANY.

736—Coagulant Aids — Product reports and case studies available on seven new Claracel formulations — effective flocculating agents and coagulant aids for use in potable water supply systems. — THE NORTH AMERICAN MOGUL PRODUCTS COMPANY.

(Continued on Page 86)

Shepard Niles Hoists:
JOB-MATED
for Greater SAFETY



Shepard Niles

Explosion-Proof Hoist

In load-lifting and moving operations, the difference between costly accidents and dependable, hazard-free performance lies in quality equipment.

Shepard Niles JOB-MATED Hoists provide superior performance . . . minimum wear and maintenance . . . and extended service life, because we specify the ideal combination of quality components to meet exact on-the-job conditions. Care like this in our plant means greater safety for personnel and equipment in yours.

Shepard Niles offers you a JOB-MATED Hoist for every application. Choose from vapor-proof and explosion-proof models . . . ¼-ton to 30-ton capacities . . . with the new Shepard Niles Safety Hook and Traveling Pushbutton Pendant as added safety features. For further information, write for descriptive bulletin. Ask to have a Shepard Niles representative call.

America's Most Complete Line of Cranes and Hoists

Member of Hoist Manufacturers Association, Inc.

SHEPARD NILES
CRANE AND HOIST CORPORATION

1670 Schuyler Ave., Montour Falls, N.Y.

Bulletins (Cont.)

737—Water Treating Plan — Separate bulletins combine in folder to form "A Complete Water Treating Plan" for boiler feedwater and cooling water treatment. Leaflets cover various aspects of treatment and equipment. — DEADY CHEMICAL COMPANY.

751—Chemical Service — Water conditioning products, equipment and services highlighted in literature —boiler feedwater treatment, cooling water treatment, corrosion inhibitors, fuel oil additives, coagulants, cation resin cleaners. — Chemical Service Dept., THE PERMUTIT COMPANY.

756—Refrigeration Problems?—VMC Compressors, intercoolers, chillers, described in Bulletin 817 — design improvements, protective devices and factory-run-in-tests.—THE VILTER MANUFACTURING COMPANY.

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757—Boiler Water Treatment—Data sheets P-101 through P-107 summarize products and their application. — FULBRIGHT LABORATORIES, INC.

774—Refrigerating Units — Bulletin 97-F illustrates and describes low pressure refrigerating units. — FRICK CO.

ELECTRICAL

801—Motors—Bulletin describes and catalogs more popular a-c motors from 1 to 600 hp, for every process and manufacturing requirement. Single phase and polyphase; surpass NEMA specifications. — BROOK MOTOR COMPANY.

802—Low-Peak Fuses — New fuses that safely interrupt fault currents up to 200,000 amp described in Bulletin LPS. Protect mains, feeders, branch circuits, switches. Limit fault current to very low values. Hold 500% load for minimum of ten seconds. Available in N. E. C. sizes from 15 to 600 amp in both 250 and 600 volt ranges.—BUSSMANN MFG. DIV.

803—Power Control — Bulletin describes design, manufacturing and consulting services for motor control centers; switchgear; power centers; specialty, mechanical and automation control requirements. — POWER CONTROL COMPANY.

807—Motor Bearings — Catalog 258 gives complete listing of cast bronze motor bearings for all makes and sizes.—THE BUNTING BRASS AND BRONZE COMPANY.

813—600-Volt Wiring—How Anaconda Densheath 900 offers long life, high heat and moisture resistance, chemical stability and easy installation is described in Bulletin DM-5612. — ANACONDA WIRE & CABLE CORP.

816—High Voltage Protection—36 page catalog of linemen's protective equipment describes products for utility and industrial electrical fields. — CHARLESTON RUBBER COMPANY.

877—Motor & Commutator Maintenance — Line of resurfacers, flexible abrasives, grinders, brush seaters, undercutters and other tools described in Motor Maintenance Products catalog. — IDEAL INDUSTRIES, INC.

880—Electrical Test Kit — Amprobe literature describes Test-Master Kit — all equipment you need for electrical testing jobs. — PYRAMID INSTRUMENT CORP.

885—Electrical Maintenance — File 21 tells how to set up good electrical testing program — insulation resistance testing, motor and phase testing, cable fault location. — JAMES G. BIDDLE CO.

Late Bulletins

O-100—Liquid Chiller — Bulletin No. 3926, 10 pages, describes standard mechanical and electrical features of the new "Versare" hermetic packaged liquid chiller line.—AMERICAN-STANDARD INDUSTRIAL DIVISION, Detroit 32, Mich.

O-101—Low Voltage Distribution — "Buy Log" GEC-1100C, 92 pages, catalogs low-voltage distribution equipment, with selector charts, pricing tables, and other pertinent data. — GENERAL ELECTRIC CO., Distribution Unit, Plainville, Conn.

O-102—Air Vent Silencers — Form 2000-M88, 4 pages, covers sizes and performance of "Aircoustat" silencers, which permit passage of air while impeding flow of sound. — KOPPERS COMPANY, INC., Metal Products Division, 200 Scott St., Baltimore, Md.

O-103—Photoelectric Controls—Case History Handbook, 80 pages, tells how photoelectric controls solved 40 typical plant problems, using modulated infrared radiation. — CRAMER CONTROLS CORP., Electronics Division, Centerbrook, Conn.

O-104—Fire Pumps — Bulletin No. 401, 6 pages, shows cross section drawings, typical installations, size and capacity charts, and other details of vertical fire pump. — LAYNE & BOWLER, INC., Dept. AD, Memphis 8, Tenn.

O-105—Hand Trucks —Catalog T-60, 40 pages, provides pictures, descriptions, and specifications of "Job Fitted" two-wheel and platform trucks, from general purpose models to specialties. — THE FAIRBANKS COMPANY, 393 Lafayette St., New York 3, N. Y.

O-106—Pressure-Seal Valves — Bulletin, 6 pages, features cast steel gate and globe valves for high-pressure, high-temperature applications. — WALWORTH COMPANY, 750 Third Ave., New York 17, N. Y.

O-107—Position Transmitter —Sheet P99-10, 2 pages, gives specifications for standard transmitters, air consumption and supply, distance, connections, cams and enclosure. — BAILEY METER COMPANY, 1050 Ivanhoe Road, Cleveland 10, Ohio.

O-108—Motor Guide—Bulletin 1024, 12 pages, tabulates selection data for induction and synchronous motors, ½ to 10,000 hp, for installation on original equipment. — FAIRBANKS, MORSE & CO., Electrical Div., 303 N. Henderson, Freeport, Ill.

O-109—Built-Up Roofing —Brochure No. TA-49-61, 28 pages, includes instructions on materials and methods for installation of built-up water-tight roofing on all types of surfaces. — KOPPERS COMPANY, Pittsburgh 19, Pa.

O-110—Distribution Centers — Bulletin GEA-6928A, 20 pages, discusses new dry-type integral distribution centers featuring quiet, high-temperature dry-type transformers for applications up to 5000 volts. — GENERAL ELECTRIC COMPANY, Schenectady 5, N. Y.

O-111—Steam Temperature Control —Bulletin 543, 4 pages, diagrams operation and control principle of steam temperature control by desuperheating, and by tilting burners and desuperheating. — BAILEY METER COMPANY, 1050 Ivanhoe Road, Cleveland 10, Ohio.

O-112—Industrial Pumps — Bulletin One, 8 pages, catalogs power driven and hand pumps, proportioning systems, strainers, and related equipment for liquid handling in processing plants. — BLACKMER PUMP COMPANY, Grand Rapids, Mich.

O-113—Insulated Motors — Bulletin 05-51B9040B, 10 pages, introduces "Super-Seal" motors with Poxeal and Silco-Flex insulations, for use under severe operating conditions. — ALLIS-CHALMERS MANUFACTURING CO., Milwaukee 1, Wis.

O-114 — Charger-Battery Combination—Bulletin AR-104 describes a combination battery and charger for standby starting of gasoline or Diesel engines. — THE ELECTRIC AUTOLITE COMPANY, C & D Batteries Division, Conshohocken, Pa.

O-115 — Rotary Joints — Catalog 310B, 4 pages, illustrates and describes rotary joints that require

no lubrication, work for single flow or syphon steam service, and handle steam and fluids from chilled water to 600 F oil. — BARCO MANUFACTURING CO., Barrington, Ill.

O-116—Controlled Volume Pumps— Bulletin 553-2, 32 pages, "Motor-Driven Controlled Volume Pumps," features a selection data guide, charts, and capacity-pressure tables. —MILTON ROY COMPANY, 1300 E. Mermaid Lane, Philadelphia 18, Pa.

O-117—Heat Exchangers — Bulletin 120, 8 pages, tells how to install and maintain double pipe heat exchangers — conventional as well as newer multi-tube and low pressure types. — BROWN FINTUBE COMPANY, 300 Huron St., Elyria, Ohio.

O-118—Conversion Kits — Pub. PL 12-35-960, 8 pages, can be used as wall chart on 30 color-selective conversion kits for modifying "PM" relays. — THE CLARK CONTROLLER CO., 1146 East 152nd St., Cleveland 10, Ohio.

O-119—Mercury Lamps — Manual, 28 pages, gives technical information on mercury vapor lamps, auxiliaries, and applications. — WESTINGHOUSE LAMP DIVISION, Bloomfield, N. J.

O-120—Bucket Elevators — Bulletin No. 174, 22 pages, covers various types of bucket elevators and belting for handling bulk materials. —HEWITT-ROBINS INC., 666 Glenbrook Road, Stamford, Conn. .

O-121—Transite Pipe—Guide TR-62A, 124 pages, shows latest product design information and field installation recommendations for users of Transite pressure pipe. — JOHNS-MANVILLE, 22 East 40th St., New York 16, N. Y.

O-122—Circuit Breakers — Bulletin 4300-1A, 10 pages, features the new K-Don current-limiting circuit breakers and switchgear, with selection tables and photographs. —I-T-E CIRCUIT BREAKER COMPANY, 1900 Hamilton St., Philadelphia, Pa.

New Pump Handbook By Igor J. Karassik

Centrifugal Pumps: Selection, Operation, and Maintenance has recently been published by F. W. Dodge Corporation, 119 W. 40th St., New York. Authors are Igor J. Karassik, consulting engineer and manager of planning at Worthington Corp. (whose *Centrifugal Pump Clinic* appears regularly in S.P.I.) and the late Roy Carter of Worthington. Encyclopedic in scope, the book has been prepared as a comprehensive reference for plant engineers and designers, pump operators, buyers, maintenance men, and others concerned with the moving of liquids or liquified gases in bulk.

There are 27 chapters. One details what must be known about the conditions of service before a pump is ordered. Others discuss types of construction, performance, controls, drivers, priming, installation, operation, maintenance and trouble-shooting. The volume is a practical, finger-tip handbook, and theory is introduced only where it is essential to understanding of specific problems.

Every part of the pump unit is discussed and shown in detail, including casings, impellers, shafts, stuffing boxes, seals, bearings, bedplates, controls, diffusers, wearing rings, shaft sleeves, balancing devices, injection seals, couplings, supports, drivers. All materials of construction are analyzed for selection, performance, and repair.

The many topics covered tell how to get maximum service with minimum maintenance and outage; how to repair or restore every element in the pumping unit; how to select the most efficient, most economical pump; how to select the proper controls and driver for any centrifugal pump; how to select the right materials for constructing any pump for any specific service. Tested methods show how to get longer pump life at lowest cost.

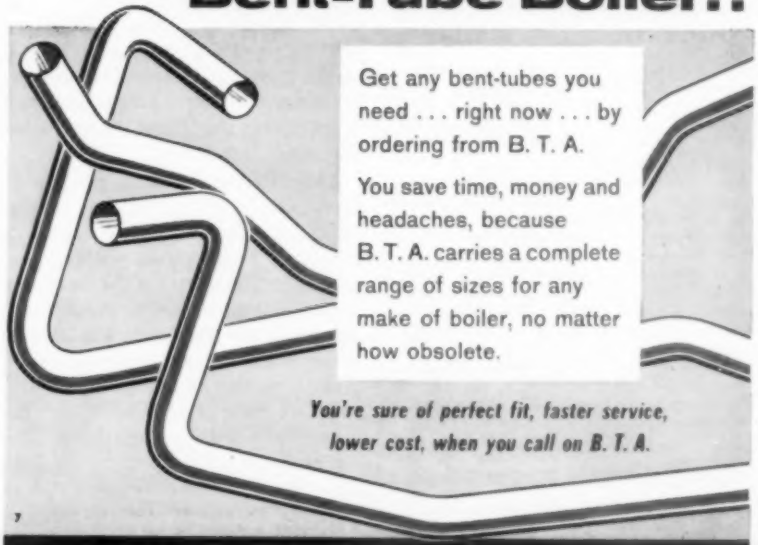
There are 575 illustrations, including photographs, drawings, schematics, layouts, tables, charts, diagrams, and checklists. Price of the 488-page, clothbound volume is $15.75.

New Developments (Continued from Page 67)

But figures for total car capacity are elusive. The Russians do not furnish outsiders with such figures. Keller listed a guess of 1.3 million cars on the Soviet equipment list. Automatic car coupling, similar to American designs, is seen increasingly.

Soviet passenger cars differ quite a bit, however, from their American counterparts. Only a few have soft seats for daytime travel and air conditioning is just in the experimental stage. If you want air, you open a window. All passenger carrying cars designed for long distance travel are equipped for utilization as sleeping cars, with

If yours is a Bent-Tube Boiler..



Get any bent-tubes you need . . . right now . . . by ordering from B. T. A.

You save time, money and headaches, because B. T. A. carries a complete range of sizes for any make of boiler, no matter how obsolete.

You're sure of perfect fit, faster service, lower cost, when you call on B. T. A.

BOILER TUBE COMPANY OF AMERICA

McKEES ROCKS, PA. (Pittsburgh District) Federal 1-7750

METROPOLITAN EDISON uses . . .

ILLCO-WAY ionXchange

This graphic control panel, designed and built by IWT, not only has all the controls but also a schematic diagram with indicating lights to show the action at all points.

Blowdown Unnecessary in a New High-Pressure Once-Through Boiler

The Portland Station of Metropolitan Edison Company at Portland, Pa., has a once-through type of boiler for which the purity of make-up water is particularly critical. IWT Mixed-Bed* De-Ionizers were selected to purify the make-up water to the required degree — and they succeeded, even beyond expectations. The total silica in the boiler water is consistently maintained at 0.1 ppm or less. From the Mixed-Bed* De-Ionizer, the silica is normally below 0.01 ppm and log sheets frequently show analyses as low as 0.003 and 0.005 ppm. With such a high purity of make-up water, blow-down is entirely unnecessary for extended periods of time. All IWT equipment — including chemical feeders, gravity filters, cation and anion exchangers, a vacuum degasifier, and the Mixed-Bed* De-Ionizers — are controlled *automatically* from the graphic panel shown above.

*U.S. Pat. Nos. 2,605,084, 2,771,424

PIONEERING EXPERIENCE

Such outstanding performance is the result of intensive early and continuing experience, by Illinois Water Treatment Co., with the special problems of ion-Xchange. *To benefit from this leadership, call your IWT representative.*

ILLINOIS WATER TREATMENT CO.
840 CEDAR ST., ROCKFORD, ILLINOIS
NEW YORK OFFICE: 141 E. 44th St., New York 17, N.Y.
CANADIAN DIST.: Pumps & Softeners, Ltd., London, Ont.

(Continued from Page 87)

few exceptions. They are provided with either soft or hard seats, with backs or shelves that can be raised and used for sleeping purposes.

Hard seats are of wood construction without any cushions or upholstery. Soft seats have cushioned upholstery and back rests. Safety glass is not generally used and the glass in car windows is of such quality that from many of the windows, the view is distorted by the imperfections in the glass.

In the locomotive field, steam power still predominates, although the Russians are rapidly converting to electric or diesel electric power. Most of their diesel design is based on western counterparts. The Soviets are also buying French and German locomotives.

As far as rumors of nuclear powered locomotives go, they seem unfounded. The potential use of nuclear power so far as the railroads are concerned would be in its application to generation of electricity in central power stations.

The Russians staff their railroads mainly with graduates of the state's railroad technical institutions. Women are employed extensively. It is difficult for a graduate to change his field after taking a course in some phase of railroad work. However, there is little incentive to change since railroading in the Soviet is a prestige industry, provides for travel and is generally at higher pay rates than most of the other industries.

The Russians are a long way from catching up to the United States in capacity or equipment, however. Propaganda posters portray the Russians as passing the United States in 1965, which is not likely to be the case. The Soviet government is not sparing manpower, money or laboratory equipment to promote research and development for railroading. The program is more extensive than that of any other single railroad system. However, the success of any program must be measured by results. Compared to the United States, the U.S.S.R. is still behind, but progress is being made.

Aircraft Maintenance

If the commercial jet age is going to be economical as well as fast, quicker methods of checking and overhauling passenger airplanes must be found. A saving of one hour a day (on the ground) would be worth in excess of $3.5 million dollars per year per airplane. A method by which this could be accomplished has been suggested by Charles L. Blake, Transport Systems Development Manager, and Eric R. Woods, Avionics Design Specialist, both of Convair.

A computer built into each aircraft would permit the jet to be under constant check in the air and make for quicker service on the ground. For example, suppose, in mid-flight, the pressurized cabin began leaking air around a window, a condition that could become dangerous. The control unit for the pressure system would instantaneously react by closing off the normal outflow of air and regulating the inlet air compressor. At the same time it would notify the central computer of the failure and rate at which pressure was being lost.

The computer would immediately react to reduce altitude to a safe level, and notify the crew of the situation. The crew would have the ability to override the automatic control.

As soon as the plane landed, the ground crew, which would have all necessary information, could repair it. Such a computer would also be used to provide data for maintenance engineers.

For ground use, a "universal" tester, about the size of a suitcase, combining a digital computer, generators and measurement devices not convenient for incorporation into the aircraft, could be employed. It would require a minimum of personnel.

Of course, planes must have the most practical logical arrangement of systems possible. By grouping components into well-planned subassemblies or modules, the trouble-shooting problem can be greatly eased.

While there is an engineering design cost associated with this approach, the operator will realize higher utilization, optimized performance and reduced maintenance costs.

News of the South-Southwest

(Continued from Page 22)

Guiberson Corp. — Tex.

The appointment of Robert L. Boyd as executive vice-president and general manager of **Guiberson Corporation** was announced by Dresser Industries, Dallas, Texas following

the resignation of Alex Smith, who, heretofore, served in this capacity.

Mr. Boyd's former associations include American Sterilizer Company, Turner Corporation, Lehigh Coal and Navigation Company. He is a graduate of Middlebury College and Temple University, and is active in the American Management Association and National Industrial Conference Board.

Tube Turns — Ga.

Appointment of Lewis M. Crowe Company, Atlanta, as special manufacturer's representative for the full line of "Tube-Turn" bellows expansion joints for industrial piping was announced by **Tube Turns Division of Chemetron Corporation,** Louisville, Ky.

The Crowe company's territory includes Georgia and all of Florida except that portion west of the Apalachicola River.

Allis-Chalmers Southern Distributors

Appointment of two new distributors in Kentucky and Virginia has been announced by **Allis-Chalmers Industries Group.**

Powr-Lite Electric Supplies, Inc., 138 East Main St., Bowling Green, has been named a distributor for Allis-Chalmers distribution transformers in 20 Kentucky counties. F. D. Gregory is president and treasurer of the firm and Ward Mann is sales manager.

C. E. Thurston & Sons, Inc., 850 Tidewater Drive, Norfolk, has been named a distributor for Allis-Chalmers motors, generators, and centrifugal pumps in southeastern Virginia and northeastern North Carolina.

C. E. Thurston, Jr. is president and E. E. Owens, vice-president in charge of sales.

It has also been announced that the Guyan Machinery Co., Inc., 755 Stratton St., Logan, West Virginia, has been named a distributor for **Allis-Chalmers** control equipment in counties in West Virginia, Virginia, and Kentucky. B. Shell, Jr. is president of the company, W. A. Jones, secretary and treasurer, and H. M. Mathews, sales manager.

Killark — Mid-South

Mid-South Sales, Inc., 4828 Parkside Ave., Memphis, Tennessee, has been named a sales agent for **Killark Electric Manufacturing Company,** St. Louis.

Mid-South Sales, Inc. is operated by Joseph F. Devereux. Assigned territory includes western Tennessee, northern Mississippi, and all of Arkansas. The new representative will handle Killark's entire line of aluminum conduit fittings, light fixtures, and other types of electrical enclosures.

Airmatic — Carolinas

Barker Instrument & Machine Co., Inc., P. O. Box 3598, Greenville, S. C.; and P. O. Box 3120, Charlotte 3, N. C., has been named Carolina representative for **Airmatic Valve, Inc.,** of Cleveland, Ohio.

Yuba-Tulsa — Okla.

R. A. Beck has been appointed vice-president and director of sales for the **Yuba-Tulsa Corporation.** The Oklahoma plant is the company's major manufacturing center for heat exchangers and furnaces used in the petroleum and chemical industries.

Mr. Beck, who was transferred from Yuba Consolidated Industries' Heat Transfer Division in Pennsylvania, spent 20 years in various engineering and sales positions with

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Southern News Briefs (Continued)

the Lummus Company. He was assistant general manager of the Lummus Heat Transfer Division prior to its sale to Yuba.

Raymond Concrete Pile Names Southern Manager

Raymond Concrete Pile Division of Raymond International Inc., 140 Cedar St., New York 6, N. Y., has announced four newly created positions of regional manager, as part of the Division reorganization.

Manager for the Southern region is C. J. Van Horn, who joined Raymond in 1941. During the past eight years, Mr. Van Horn has served as general superintendent, covering the Division's activities in the Miami, Atlanta, New Orleans and Houston districts, which make up the new Southern region. He has also been elected as assistant vice-president. He makes his headquarters in Atlanta.

The Baltimore and Washington districts are supervised by J. P. Cummins, manager of the eastern region, with headquarters in New York.

Kansas City and St. Louis are included in the central region, headed by C. E. Simmons at Detroit.

Fisher-Pierce — Fla.

The Fisher-Pierce Division of Sigma Instruments, Inc., South Braintree, Mass., has appointed Bowen-Arnold Agency as a sales representative for its line of photoelectric streetlighting controls and associated equipment in all of Florida except the area west of the Apalachicola River. The agency has two offices: 190 S. E. 14th Terrace, Miami; and 4228 Cortez Way South, St. Petersburg.

Pkg. Generator Expansion

Iron Fireman Mfg. Co., 3170 W. 106th St., Cleveland 11, Ohio, recently announced that it has expanded its operations in the package generator field.

The new series, free from radical departures in design but reflecting significant improvements in engineering techniques, is being developed for those who prefer to purchase package generators from one company only. Iron Fireman alone will be responsible for design, workmanship and materials. Gilbert Nelligann, director of this expanded department in the Heating & Air Conditioning Division, has been associated with the heating industry since 1931.

Iron Fireman will continue its manufacture of gas, oil and gas-oil burners — both as separate equipment, and as part of boiler-burner combination units distributed in cooperation with several prominent producers of boilers on the basis of separate production, separate label and separate responsibility.

Melpar — Virginia

W. Gerald James has been appointed Special Assistant to Vice-President for Advanced Development Robert E. Miller, it was announced

by **Melpar, Inc.,** Falls Church, Virginia, one of the nation's leading electronics and research firms.

Mr. James was Manager of the Electronics Research and Development Laboratory of American Machine and Foundry Company, Alexandria, from 1956 through 1960. In 1954, he was named Manager of the Components Development Section of ACF Industries' Electronics Division, also in Alexandria.

Armstrong Cork — K.C.

Donald W. Kuhn has been appointed manager of the Kansas City District Office of the **Armstrong Cork Company's** Insulation Division to succeed F. C. Young who has retired after 40 years of service.

Mr. Kuhn joined Armstrong in 1956. He was assigned to the St. Louis Branch Office following completion of sales training.

Parker-Hannifin — S. C.

Appointment of Coleman Company, Inc., 305 Rutherford Road, Greenville, South Carolina, as a distributor for the Hydra-ride accumulator, is announced by **Parker-Hannifin Corporation.** The shock-absorbing device for material handling vehicles is a product of the Parker Hydraulics Division.

The Coleman firm, according to M. R. Hawley, manager, will maintain stocks for prompt handling of customer demands, and is an outlet also for Parker industrial hose fittings.

Davidson-Kennedy — Ga.

Davidson-Kennedy Company, Atlanta machinery manufacturer, has named Tom C. Campbell vice-president. He will also serve as president of Manufacturers Products Company,

a wholly owned subsidiary. A native of Tullahoma, Tennessee, Mr. Campbell attended Georgia Tech and was graduated from the United States Military Academy at West Point. Prior to joining Davidson-Kennedy Company, he was regional manager of Foote Bros. Gear and Machine Corp. He was previously Production Engineer at Central Soya Company, Chattanooga. Mr. Campbell is a Registered Professional Engineer, a member of American Society of Mechanical Engineers and National Society of Professional Engineers.

Allis-Chalmers — Ky.

Beltline Electric Co., 539 South Third St., Paducah, Kentucky, has been appointed distributor for **Allis-Chalmers** motors and control equipment in nine counties in Kentucky and in Massac county in Illinois.

Texas Gas — La.

The appointment of L. T. Sloan as assistant manager of the **Texas Gas Transmission Corporation's** Louisiana Division, has been announced.

In his new position, Mr. Sloan will assist in the direction of the greatly expanded gas-gathering, measurement and dispatching operations of the Louisiana division, which is made up of South Louisiana

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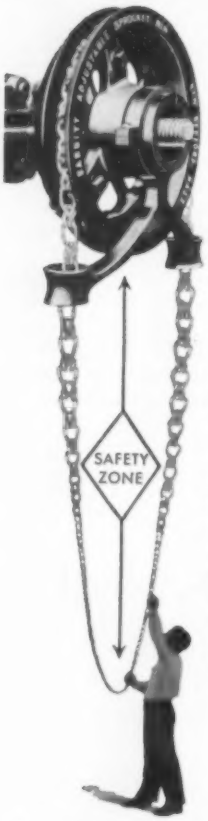

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Southern News Briefs (Continued)

and the immediate Gulf Coast area.

Mr. Sloan joined Texas Gas in 1937 at Clarksdale, Miss., and later served as district pipe line superintendent at Greenville, Miss., and assistant division superintendent in the company's pipe line department in Owensboro, Ky.

C & D Batteries — Ga.

R. T. Josey, Jr., 1361 Byrere Terrace, S. W., Atlanta, is now associated with Mark C. Pope Associates,

representative in the Atlanta area for **C & D Batteries, Div. The Electric Autolite Co.**

C & D manufactures industrial storage batteries to power electric lift trucks.

Previously, Mr. Josey had been with the Georgia Power Company. He received his training at the Georgia Tech Engineering Evening School where he studied electrical technology.

Acme — Tampa

In conjunction with expansion in the Southeast, initiated by the opening of a new plant facility in Greenville, Alabama, **Acme Industries** has established a new regional office in Tampa, Florida. This move is to strengthen sales engineering services with direct factory representation in the area.

Howard W. Ward from Acme's Chicago office has been appointed to head up the new headquarters at 1715 Grand Central Avenue, Tampa.

Allis-Chalmers — Tenn.

Appointment of a new distributor and agency in Tennessee for various of its Industries Group products has been announced by **Allis-Chalmers.**

The Ocoee Electric Supply Co., Church at 18th S.E., Cleveland, Tenn., has been named a distributor for Allis-Chalmers motors and control equipment in Bradley county. Wendell H. Childrey is president and sales manager.

The Meter Service & Supply Co., 1496 Humber St., Memphis, an Allis-Chalmers distributor, has been appointed an agency for the firm's capacitors in an area which includes parts of Arkansas, Missouri, Kentucky, and Tennessee. Owner and manager is Joe W. Deming.

Parker-Hannifin — Tulsa

P. D. Browne Company, 2512 West Mockingbird Lane, Dallas 35, Texas, has opened an Oklahoma office at 3216 East 21st Street, Tulsa. Dave Lindley is in charge of the office, which will serve the entire state except for the extreme western part.

The company, with an office also in the Continental Bank Building, Houston 2, is a manufacturers representative for **Parker-Hannifin** pneumatic and hydraulic products.

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Eutectic — Dallas

Richard L. Carpenter has been appointed Manager of the Dallas Service & Training Center of **Eutectic Welding Alloys—Southwestern Division, Inc.** He was formerly manager of credit and dealer sales for Clearview Corporation, in Dallas. He has also been associated with Seiberling Rubber Company in Garland, Texas, and the City Employees Credit Union, Dallas.

From its Service & Training Center the company serves a large area of the Southwest with its welding rods, electrodes, and chemical aids. The Center also houses facilities for the Eutectic Welding Institute which offers free training in maintenance and repair welding.

Murray — La. & Ark.

The Chester R. Lloyd Company of New Orleans and Little Rock is the newly appointed sales representative for **Murray Manufacturing Corporation** in the South Central area, which includes Louisiana, Arkansas and Mississippi. The main office and warehouse is at 1031 Magazine Street in New Orleans. A branch office is at 2519 Ringo Street in Little Rock.

Dresser Industries— Reed Roller Bit Co.

The Boards of Directors of **Dresser Industries, Inc.**, Dallas, Texas, and **Reed Roller Bit Co.**, Houston, have agreed in principle on a plan under the terms of which Dresser will acquire the business and assets of Reed, as well as assume its liabilities, upon the issuance of 477,050 shares of Dresser common stock. Attorneys for the companies are preparing a formal agreement covering the transaction which is contingent upon approval of the definitive agreement; upon favorable opinion of legal counsel for both companies; and approval by the Reed shareholders.

Multi-Metal Wire Cloth — South

In order to provide more extensive sales and engineering coverage throughout the South, **Multi-Metal Wire Cloth Co., Inc.**, New York, announces the following territorial changes:

The Christian Company, 506 Travelers Building, Richmond 1, Va., will cover North Carolina, South Carolina and Virginia.

Evans Engineering & Sales Co., P. O. Box 1563, Lakeland, Fla., will cover Florida, Georgia, Tennessee, Alabama and Mississippi.

The Watts Company, 2323 University Boulevard, Houston 5, Texas, will cover Arkansas, Louisiana, Oklahoma and Texas.

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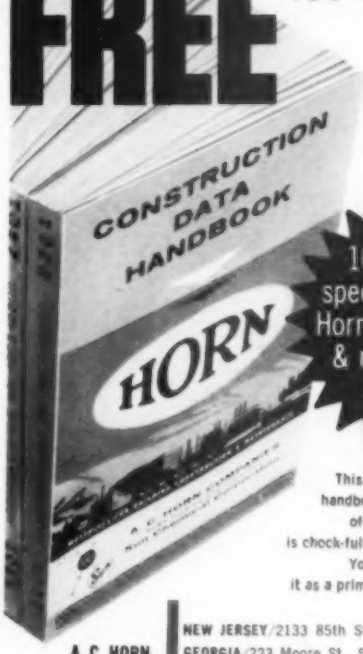

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Index of Advertisers

This Advertisers' Index is published as a convenience, and not as a part of the advertising contract. Every care will be taken to index correctly. No allowance will be made for errors or failure to insert.

A

Acme Industries, Inc. 11
Airetool Mfg. Co., The ..... *
Air Preheater Corp. ..... *
Allied Metal Hose Co. ..... *
Allis-Chalmers Mfg. Co. ..... *
American Glass Tinting Corp. ..... *
American Standard, Industrial Div. ..... *
Ames Iron Works, Inc. ..... *
Anaconda Wire Cable Co. ..... *
Anchor Post Products, Inc., Fence Division ..... *
Anderson Chemical Co., Inc. 82
Anderson Co., V. D. ..... *
Armco Drainage & Metal Prod., Inc. 9
Armstrong Machine Works ..... *
Atlantic Steel Co. 83

B

Babbitt Steam Specialty Co. 92
Bailey Meter Co. ..... *
Baker Industrial Trucks 91
Bettcher Mfg. Corp., The Panelblock Div. ..... *
Bird-Archer Co. ..... *
Blaw-Knox Company, Commercial Grating ..... *
Blaw-Knox Co., Copes-Vulcan Div. ..... *
Boiler Tube Co. of America 87
Boston Gear Works ..... *
Buell Engineering Co., Inc. 21
Butler Mfg. Co., Plastics Dept. Bldg. Div. ..... *
Bussmann Mfg. Co. 60, 61
Byron Jackson Pumps ..... *

C

Catawissa Valve & Fitting Co. ..... *
Chase Brass & Copper Co. ..... *
Chemical & Power Prods. 89
Cherry Way Corp. (Hotel Pittsburgher) 91
Clarage Fan Co. ..... *
Classified ..... *
Cleaver-Brooks Co., Boiler Div. 23
Cleaver-Brooks Co., Watertube Div. ..... *
Cleveland Tramrail Div., Cleveland Crane & Engineering Co. ..... *
Cochrane Corporation ..... Back Cover
Columbia-Geneva Steel Div. ..... *
Continental Conveyor & Equip. Co. 90
Copes-Vulcan Division, Blaw-Knox Co. ..... *

D

Deady Chemical Company ..... *
Dearborn Chemical Co. 1
Detroit Stoker Co. ..... *
Diesel Injuction Sales & Service ..... *
Dixie Bearings, Inc. 2

E

Eastern Stainless Steel Corp. ..... *
Elgin Softener Corp. ..... *
Ellison Draft Gage Co., Inc. ..... *
Erie City Iron Works ..... *

F

Fairbanks Co., The ..... *
Fairmont Chemical Co., Inc. ..... *
Finnigan, J. J. Co., Inc. ..... *
Fly Ash Arrestor Corp. ..... *
Foster Wheeler Corp. ..... Second Cover
Frick Company ..... *
Fulbright Laboratories, Inc. 33

G

Gates Engineering Co. ..... *
General Coal Co. 15
General Electric Co. ..... *
Graver Tank & Mfg. Co., Inc. ..... *
Green Fuel Economizer Co. ..... *
Greene Tweed & Co. ..... *
Grinnell Co., Inc. ..... *
Gulf Oil Corp. ..... *
Gustin-Bacon Mfg. Co. ..... *

H

Haering & Co., Inc., D. W. ..... *
Horn Companies, A. C. 93

I

Illinois Water Treatment Co. 88
Industrial Combustion, Inc. 16
IPCO Laboratories, Inc. 79

J

Jenkins Bros. ..... Third Cover
Jordan Corporation ..... *

K

Kano Laboratories ..... *
Kee Klamps North America Ltd. ..... *
Keeler Co., E. 59
Kellogg Company, M. W. 70, 71

L

Lion Oil Company ..... *
Liquidometer Corp. 75

M

Manzel Division of Houdaille Industries, Inc. ..... *
Marley Co., Inc. ..... *
Mason-Neilan Divisions, Worthington Corp. ..... *
Mathews Conveyor Co. ..... *
Metco, Inc. ..... *
Midwest Piping Co., Inc. 56, 57

N

National Tube Co. 19
Niagara Blower Co. ..... *
North American Mogul Products Co. ..... *
North State Pyrophyllite Co., Inc. ..... *

O

Onox, Inc. ..... *
Orr & Sembower, Inc. ..... *
Otis Elevator Co. ..... *

P

Pacific Pumps, Inc., A Division of Dresser Industries, Inc. ..... *
Pantex Mfg. Corp. ..... *
Patterson-Kelley Co., The 7
Permutit Co., The ..... *
Pittsburgh Piping & Equipment Co. ..... *
Powell Valves 58

R

Reliance Gauge Column Co. ..... *
Reynolds Aluminum Supply Co. 4, 5
Reynolds Metals Co. ..... *
Riley Stoker Corp. 54, 55
Robvon Backing Ring Co. 17
Ruberoid Co., Industrial Prods. Div. ..... *

S

Sarco Co., Inc. ..... *
Shepard Niles Crane & Hoist Corp. 85
Southern Pipe Coating Co. ..... *
Southern Power & Industry ..... *
Southern Railway System ..... *
Southern Water Conditioning 92
Sprague Electric Co. ..... *
Standard Oil Co. ..... *
Subox, Inc. ..... *
Superior Combustion Industries, Inc. 63

T

Tennessee Corporation ..... *
Texsteam Corporation ..... *
Thomas Flexible Coupling Co. ..... *
Titusville Iron Works Co. ..... *
Todd Shipyards Corp., Combustion Equipment Division ..... *
Truscon Laboratories ..... *

U

U. S. Hoffman Machinery Corp. 25
Union Steel Corporation ..... *
United States Steel Co. 19
Universal Metal Hose Co. ..... *

V

Vilter Mfg. Co. 77
Vogt Machine Co., Henry ..... *

W

Want Ads ..... *
Webster Engineering Co. ..... *
Westinghouse Electric Corp. ..... *
Wickes Boiler Co. 13
Wide-Lite Corporation ..... *
Williams Gauge Co., Inc., The ..... *
Wilson, Inc., Thomas C. ..... *

Y

Yarnall-Waring Co. 51
Yuba Consolidated Industries, Inc., Heat Tranfer Div. ..... *

Z

Ziegler & Co., G. S. ..... *

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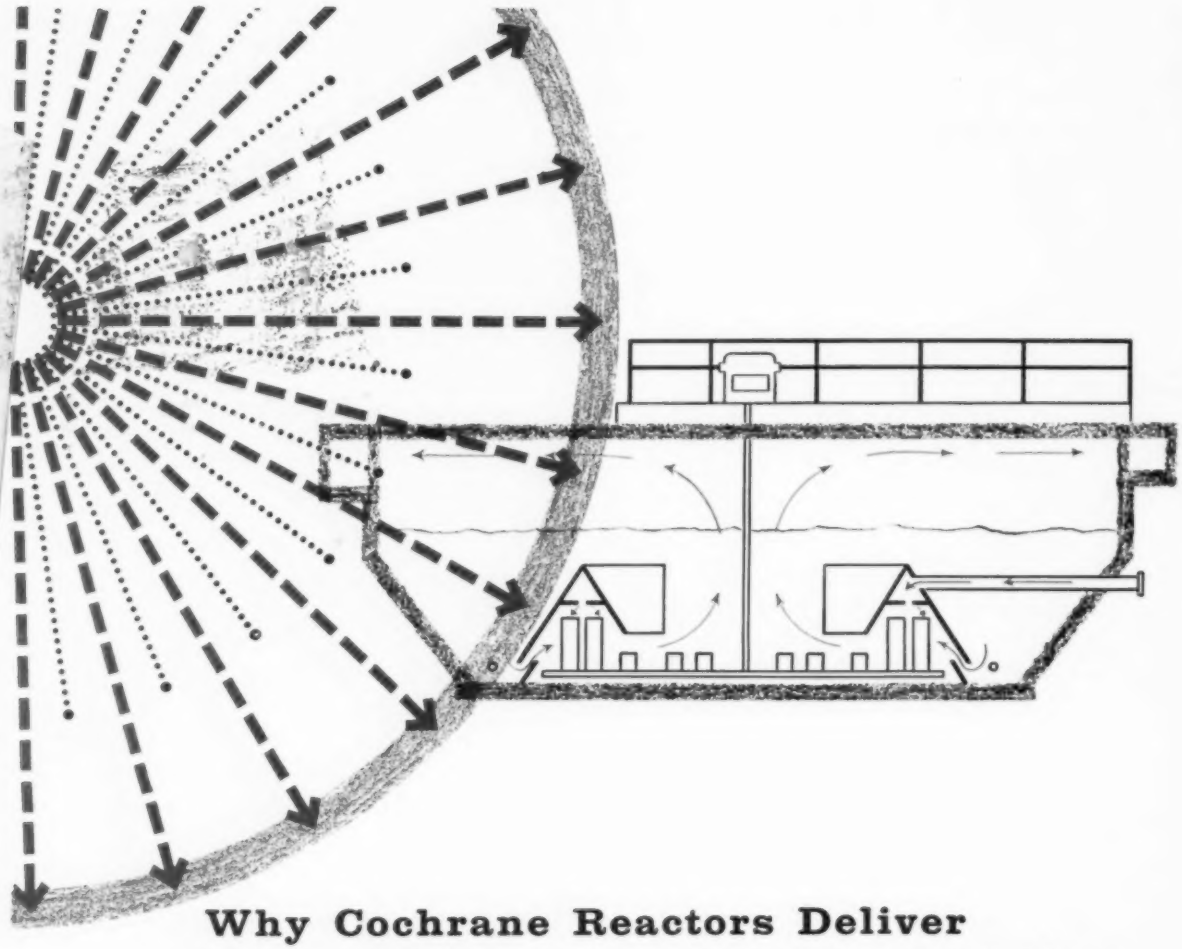

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